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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
PHOENIX DIVISION

UNITED STATES OF AMERICA, and STATE OF ARIZONA, Plaintiffs, v. MOTOROLA INC., SIEMENS CORPORATION, THE SALT RIVER VALLEY WATER USERS' ASSOCIATION, and GLAXOSMITHKLINE, Defendants, and CITY OF SCOTTSDALE, Rule 19 Party.	CIVIL ACTION NO. CV 91-1835-PHX-~~WPC~~ FJM AMENDED CONSENT DECREE

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RECITALS

WHEREAS, the United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), and the State of Arizona ("State") have filed a Complaint in this matter on November 19, 1991, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. §§ 9601-9675, to compel the Defendants to perform remedial actions and to recover response costs that will be incurred by the United States and the State in response to releases and threatened releases of hazardous substances from a facility known as the Indian Bend Wash, North Site located at Scottsdale, Arizona ("NIBW" or "Site");

WHEREAS, in 1983, EPA listed an area including the Site on the National Priorities List ("NPL") for appropriate response actions pursuant to CERCLA;

WHEREAS, in 1991, all Parties hereto agreed that settlement of this matter and entry of a Consent Decree (hereinafter "1991 Consent Decree") was made in good faith in an effort to avoid further expensive and protracted litigation, without any admission as to liability for any purpose;

WHEREAS, the 1991 Consent Decree required the performance of certain Work to remediate NIBW Contaminants of Concern at the Site;

WHEREAS, in 2001, EPA decided that the remedial action at the Site would require Additional Work; this decision by EPA is embodied in a Final Amended Record of Decision ("Amended ROD"), dated September 27, 2001; and the State concurred in the Amended ROD;

WHEREAS, pursuant to the Additional Work provisions of Section IX of the Consent Decree, the Additional Work requires a modification to the 1991 Consent Decree that is executed by all Parties and approved by the Court;

WHEREAS, pursuant to Sections 121 and 122 of CERCLA, 42 U.S.C. §§ 9621 and 9622, the Parties hereto have each stipulated and agreed to the making and entry of this

Amended Consent Decree prior to the taking of any testimony; and

WHEREAS, each undersigned representative of the Parties to this Amended Consent Decree certifies that he or she is fully authorized to enter into the terms and conditions of this Amended Consent Decree and to execute and legally bind such Party to this document;

NOW THEREFORE, it is ORDERED, ADJUDGED, AND DECREED as follows:

I. DEFINITIONS

The following terms used in this Amended Consent Decree are defined as follows:

A. "Additional Site Work" means any additional work that EPA determines is necessary pursuant to Section IX (Additional Site Work) of this Amended Consent Decree.

B. "Additional Work" means the work required by the Amended ROD as set forth in the Statement of Work for Remedial Design and Remedial Action for the Amended ROD, attached hereto as Appendix A.

C. "Amended Record of Decision" ("Amended ROD") means the Record of Decision Amendment for the North Indian Bend Wash Superfund Site Final Operable Unit issued by the Division Director of the Superfund Division on behalf of the Regional Administrator of EPA Region IX on September 27, 2001, attached hereto as Appendix B.

D. "ARARs" are applicable or relevant and appropriate requirements as provided for in Section 121(d) of CERCLA, 42 U.S.C. § 9621(d).

E. "Area 7 Groundwater Extraction and Treatment System" or "Area 7 GWETS" means the existing treatment system, located at Area 7 of the North Indian Bend Wash Superfund Site (See Map attached hereto as Appendix C) and as further described in Section VII.H of this Amended Consent Decree.

F. "Area 12 Groundwater Extraction and Treatment System" or "Area 12 GWETS" means the existing treatment system, located at Area 12 of the North Indian Bend

Wash Superfund Site (See Map, Appendix C), further described in Section VII.I of this Amended Consent Decree.

G. "CERCLA" means the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No.99-499 (1986).

H. The "CGTF" means the Central Ground Water Treatment Facility described in Section VII.F of this Amended Consent Decree and located at 8650 East Thomas Road, Scottsdale, Arizona.

I. "CGTF Wellfield" shall mean extraction wells COS31, COS71, COS72, and COS75A that are connected to the CGTF (or any wells that are functionally equivalent including location, depth, design, and capacity). The CGTF Wellfield shall also include any future wells connected to the CGTF.

J. "City" means the City of Scottsdale, Arizona.

K. "Effective Date" shall be the effective date of this Amended Consent Decree as provided in Section XXIX.

L. "Environment" has the meaning provided by Section 101(8) of CERCLA, 42 U.S.C. § 9601(8).

M. "EPA" means the United States Environmental Protection Agency.

N. "Excess Water" is groundwater treated by the CGTF other than Start-up Water or water delivered to City customers. Excess Water may include:

1. water that the City can not serve to customers because the City does not have customer demand for the water;
2. water that the City can not serve to customers because of a breakdown in its water distribution system;
3. water that the City can not serve to customers because the water contains a contaminant, other than an NIBW Contaminant of Concern, that exceeds a State drinking water quality standard but meets applicable NPDES discharge standards and applicable State water quality standards; or
4. water that the City can not recharge.

O. "Groundwater Monitoring and Evaluation Program" means the program described

in Section VII.B.2 of this Amended Consent Decree.

P. "GM&EP" means the Groundwater Monitoring and Evaluation Plan first described in Section VII.B.2 of the Amended Consent Decree.

Q. "Ground Water Extraction System" means the system described in Section VII.B.3 of this Amended Consent Decree.

R. "Hazardous substances" means any substance included in the definition of Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

S. "MCL" means Maximum Contaminant Level.

T. "MRTF" means the groundwater treatment facility described in Section VII.G of this Amended Consent Decree and located at 5975 North Miller Road in Scottsdale, Arizona.

U. "MRTF Wellfield" shall mean extraction wells PCX-1, PVWC-14 and PVWC-15 (or wells that are functionally equivalent including location, depth, design, and capacity). The MRTF Wellfield shall also include any future wells connected to the MRTF.

V. "National Contingency Plan" or "NCP" means the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300, promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605.

W. "New Ground Water Extraction Systems" means the systems described in Section VII.B.4 of this Amended Consent Decree.

X. "NIBW Contaminants of Concern" shall mean the contaminants identified in Table 1 of the Amended ROD.

Y. "Old Ground Water Monitoring Program" means the program described in Section VII.B.1 of this Amended Consent Decree.

Z. "Old Work" means all work required by the 1988 ROD as implemented by the 1991 Consent Decree. The Old Work includes both completed work (e.g., installation of wells required by the Old Groundwater Monitoring Program, construction of the CGTF, etc.) and ongoing work (e.g., operation of the CGTF).

AA. "Oversight Costs" means the costs incurred by the United States and the State and their contractors after the effective date of the 1991 Consent Decree for review,

inspection, analysis and verification of the performance of the Work as required under the terms of the 1991 Consent Decree and this Amended Consent Decree, to the extent such costs are not inconsistent with the NCP.

BB. The "Participating Companies" are Motorola Inc., Siemens Corporation now known as SMI Holding, LLC (for itself and its predecessor, Dickson Electronics, Inc.), and GlaxoSmithKline (for itself, SmithKline Beecham Corporation and Beckman Instruments, Inc.).

CC. The "Parties" are the entities described in Section III of this Amended Consent Decree.

DD. "1988 Record of Decision" ("1988 ROD") means the Record of Decision for the Scottsdale Ground Water Operable Unit for the Site issued by the Regional Administrator of EPA Region IX on September 21, 1988, attached hereto as Appendix D.

EE. "Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in Section XII.B. of the Amended ROD and Section III of the Statement of Work.

FF. "RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 et seq. (also known as the Resource Conservation and Recovery Act).

GG. "Release" has the meaning provided by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

HH. "Response Costs" means all costs incurred or to be incurred by EPA, the United States Department of Justice or the State in response to releases or threatened releases of hazardous substances at or from the NIBW Site that are not inconsistent with the NCP.

II. "Restoration" for the purposes of this Amended Consent Decree shall mean when EPA determines that the MCLs established in the federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j) for the NIBW Contaminants of Concern have been achieved in the Upper Alluvial Unit ("UAU"), Middle Alluvial Unit ("MAU"), and Lower Alluvial Unit ("LAU") as measured by data collected pursuant to the GM&EP and other relevant information.

JJ. "Site" or "NIBW" means the northern portion of the Indian Bend Wash ("IBW") National Priorities List Site as depicted generally on the map attached hereto as Appendix C. The Site includes all facilities identified as being a source of NIBW Contaminants of Concern in the groundwater (previously or in the future) as well as the areal extent of the groundwater plume itself. Based on groundwater data obtained in October 2001, the Site is currently bounded by McDonald Drive, Pima Road, 68th Street, and the Salt River including the aquifers designated as the LAU, MAU, and UAU. These Site boundaries are dynamic. As the groundwater contamination moves, the conceptual Site boundaries change in accordance with plume movement. The Site does not include the portion of the Indian Bend Wash Site known as South Indian Bend Wash or "SIBW". NIBW and SIBW are generally divided by the Salt River, with NIBW being located to the north of the Salt River.

KK. "SRP" means the Salt River Valley Water Users' Association for itself and the Salt River Project Agricultural Improvement and Power District.

LL. "Start-up Water" is groundwater treated by the CGTF and discharged to the SRP water supply system as follows:

1. during the initial start-up period;
2. after restarting the plant or a major component of the plant following necessary maintenance or repair; or
3. after shutdown of the plant for any reason beyond the control of the plant operator, subsequent to the initial start-up period.

Start-up Water does not include Treated Groundwater discharged following a temporary short-term shutdown of the plant because of a carbon change, power outage, well shutdown, or any other similar reasons beyond the control of the plant operator, subsequent to the initial start-up period.

MM. "State" means the State of Arizona, including the Arizona Department of Water Resources and the Arizona Department of Environmental Quality.

NN. "Statement of Work" means the Statement of Work for Remedial Design and Remedial Action for the Amended ROD, attached hereto as Appendix A.

OO. "State Drinking Water Quality Standards" are the State MCLs adopted under the Safe Drinking Water Act, 42 U.S.C., §§ 300f-300j-1; A.A.C.,Title 18, Chapter 4, Articles 1-7.

PP. "Treated Groundwater" means groundwater that has been treated for NIBW Contaminants of Concern at the MRTF, the CGTF, the Area 7 plant, or the Area 12 plant.

QQ. "United States" shall mean the United States of America and any agencies, departments and instrumentalities thereof, including the Environmental Protection Agency.

RR. "Work" means ongoing Old Work from the 1988 ROD and 1991 Consent Decree and the Additional Work required by the Amended ROD as set forth in the Statement of Work and this Amended Consent Decree.

SS. "Zone of Ground Water Contamination" means the area of groundwater in the UAU, the MAU and the LAU that has been contaminated as the result of Releases at the Site and which is contaminated at levels that exceed the cleanup levels set forth in Table 3 of the Amended ROD.

TT. "1991 Consent Decree" means the Consent Decree negotiated to implement the 1988 ROD at NIBW. The 1991 Consent Decree was signed by the United States of America and the State of Arizona as Plaintiffs and Motorola Inc., Siemens Corporation, the Salt River Valley Water Users' Association and Smithkline Beecham as Defendants and by the City of Scottsdale as a Rule 19 Party in 1991 in Civil Action Number 91-1835-PHX-WPC. The 1991 Consent Decree was entered by the Court on April 28, 1992.

UU. "1993 Consent Decree" means the Consent Decree negotiated to implement the NIBW Record of Decision issued by the Regional Administrator of EPA Region IX on September 12, 1991. This September 12, 1991 Record of Decision selects additional response actions to address the vadose zone and the UAU at NIBW. The 1993 Consent Decree was entered by the Court in Civil Action number 92-2314-PHX-PGR on August 11, 1993.

II. JURISDICTION

The Court has jurisdiction over the subject matter of this action and over the Parties to this Amended Consent Decree pursuant to Sections 106, 107, 113, 121 and 122 of CERCLA, 42 U.S.C. §§ 9606, 9607, 9613, 9621 and 9622, and 28 U.S.C. §§ 1331, 1345, and 1651(a). The Court has supplemental jurisdiction of State claims under 28 U.S.C. §1367. The Parties shall not challenge the Court's jurisdiction to enter and enforce this Amended Consent Decree. The Participating Companies, SRP, and the City submit themselves to the jurisdiction of this Court.

III. PARTIES

The Parties to this Amended Consent Decree are: (A) Plaintiffs, the United States of America, on behalf of EPA, and the State; (B) Rule 19 Party, the City; and (C) Defendants:

1. Motorola Inc. (hereinafter referred to as "Motorola");
2. Siemens Corporation now known as SMI Holding, LLC (for itself and its predecessor, Dickson Electronics, Inc.) (hereinafter referred to as "Siemens");
3. SRP; and
4. GlaxoSmithKline (for itself, SmithKline Beecham Corporation and Beckman Instruments, Inc.) (hereinafter referred to as "SmithKline").

IV. BINDING EFFECT

A. This Amended Consent Decree shall apply to and be binding upon the United States and the State and upon the City, and the other Parties and their successors and assigns. No change in ownership or corporate or partnership status shall in any way alter any member of the Participating Companies' responsibilities or the responsibilities of SRP under this Amended Consent Decree. Notice of this Amended Consent Decree and the obligations contained herein shall be provided to any successors and assigns.

B. The Participating Companies shall be jointly and severally responsible and shall remain responsible for carrying out only those activities required of them under

this Amended Consent Decree. SRP shall be responsible and shall remain responsible for carrying out only those activities required of it under this Amended Consent Decree.

C. The Participating Companies and SRP shall provide a copy of this Amended Consent Decree, as entered by the Court, and shall provide all relevant additions to the Amended Consent Decree, as appropriate, to each person, including all contractors, retained to perform the Work contemplated by this Amended Consent Decree, and shall condition any contract for the Work on compliance with this Amended Consent Decree. Notwithstanding their compliance with this provision, the Participating Companies and SRP shall be liable for any violation of Amended Consent Decree requirements committed by their respective contractors, unless otherwise excused by the terms of this Amended Consent Decree, or by the United States or the State, whichever has authority to enforce such requirement.

V. PURPOSE

A. The purpose of this Amended Consent Decree is to serve the public interest by protecting the public health, welfare, and the environment from releases and threatened releases of hazardous substances at the Site by implementation of the Work. The Parties intend that the Work will constitute the final remedy at the Site subject to the need for Additional Site Work pursuant to Section IX of this Amended Consent Decree.

B. The Additional Work is intended to implement the Amended ROD. The ongoing Old Work is intended to provide a water supply to the City that meets MCLs for NIBW Contaminants of Concern.

C. The Parties agree and the Court hereby determines that the Additional Work set forth in this Amended Consent Decree and the Statement of Work implement the Amended ROD and as such is consistent with the NCP.

D. Except as provided in Section XLII ("Final Judgment"), the Parties intend for this Amended Consent Decree to supercede the 1991 Consent Decree.

VI. OBLIGATIONS FOR THE WORK

A. The Participating Companies, SRP, and the City shall implement and complete their respective Work obligations in accordance with this Amended Consent Decree, the Amended ROD and the Statement of Work, and also in accordance with the standards, specifications, and schedules of completion set forth in, or approved by EPA pursuant to, this Amended Consent Decree and the Statement of Work.

B. Notwithstanding any approvals related to this Amended Consent Decree, permits, or other permissions which may be granted by the United States or any other governmental entity, the Parties acknowledge and agree that such approvals or permissions do not constitute a warranty by the United States or the State that the Work performed pursuant to this Amended Consent Decree will achieve the treatment goals and objectives of the Amended ROD and this Amended Consent Decree.

C. Takeover of Work

1. In the event EPA determines that any Party has failed to perform any substantial portion of the Work as required by this Amended Consent Decree or that the timely completion of any substantial portion of the Work is in jeopardy for reasons not deemed force majeure under Section XXIV, EPA may decide to take over and perform such portions of the Work. Except where necessary to address an imminent and substantial endangerment to human health or the environment, EPA will provide all Parties with 60 days written advance notice of its intent to do so. If any Party disagrees with the EPA's determination, such Party may, within 10 days of receipt of the notice, invoke the dispute resolution provisions of Section XXV of this Amended Consent Decree.

2. No Party shall be liable for any penalties for failure to complete such portion of the Work that is taken over by EPA, except as provided in Section VI.C.3 of this Amended Consent Decree.

3. If EPA takes over performance of the Work pursuant to this Section VI.C, the Party or Parties responsible for performing such Work shall pay to EPA a Takeover of Work penalty equal to the lesser of one million dollars or two times the Response Costs incurred in performance of all such Work. Such penalty shall be paid in accordance with Section VI.C.6.

4. If the Party or Parties responsible for performing such Work invoke dispute resolution, and if the result of the dispute resolution is a determination that EPA properly took over performance of the Work, the Party or Parties responsible for performing such Work shall pay the Takeover of Work penalty, plus interest at the rate specified in 42 U.S.C. § 9607, at the conclusion of dispute resolution. If the dispute resolution process determines that the Party or Parties responsible for performing such Work had not failed to perform a substantial portion of the Work as required by this Amended Consent Decree, the Party or Parties responsible for performing such Work shall pay no Takeover of Work Penalty and may resume performance of the Work.

5. By invoking dispute resolution, the Party or Parties responsible for performing such Work may contest whether EPA properly determined that the requirements of this Section for EPA Takeover of Work were satisfied and what, if any, Takeover penalties are due; provided, however, that invoking dispute resolution does not stay EPA's right to perform the Work. If, prior to performance of the Work, EPA determines that its concerns will be resolved satisfactorily, EPA shall withdraw its advance notice of intent to perform a portion or all of the Work, and the Party or Parties responsible for performing the Work shall resume performance of such Work.

6. The Takeover of Work Penalty shall be in addition to reimbursement to EPA for all Response Costs incurred as a result of EPA's Takeover of Work. If EPA performs Work pursuant to this Section, the Party or Parties responsible for performing the Work shall reimburse EPA for

Response Costs incurred in performing such Work and any applicable Takeover of Work penalty within 60 calendar days of receipt of demand for payment of such costs. Any demand for payment of Response Costs or the Takeover of Work Penalty made by EPA pursuant to this Section shall include cost documentation that verifies that the claimed costs were incurred and that the amount of the demand was properly calculated. EPA may demand payment for Response Costs under this Section any time after costs are incurred by EPA in accordance with this Section.

VII. WORK TO BE PERFORMED

A. The Participating Companies, SRP, and the City shall implement and complete their respective Work obligations set forth in the Statement of Work. All Work shall be performed in accordance with the NCP and all amendments thereto that are effective and applicable to any activity undertaken pursuant to the Amended Consent Decree, and also in accordance with the Performance Standards, specifications, deliverables and schedules of completion set forth in, or approved by EPA pursuant to, this Amended Consent Decree and the Statement of Work. All Work shall be performed by qualified employees or contractors.

B. Requirements for Work by the Participating Companies

In addition to their obligations set forth in other applicable sections of this Amended Consent Decree, the Participating Companies shall perform the following Work:

1. Old Ground Water Monitoring Program

   a. The Participating Companies shall be responsible for all Old Ground Water Monitoring Program activities for which SRP is not expressly responsible until such time that the GM&EP described in Section VII.B.2 below and associated Phase I Sampling and Analysis Plan (Phase I SAP) have been approved by EPA. The existing groundwater monitoring well network was installed to fulfill the requirements of the Old Ground Water Monitoring

Program. No additional monitoring wells will be required under the Old Ground Water Monitoring Program.

2. Groundwater Monitoring and Evaluation Program

   a. With the exception of those activities for which SRP is expressly responsible in this Amended Consent Decree, the Participating Companies shall be responsible for all Groundwater Monitoring and Evaluation Program activities described in the Statement of Work attached hereto as Appendix A.

   b. The Participating Companies shall use their best efforts to obtain access to real property for the Groundwater Monitoring and Evaluation Program under reasonable terms and conditions, as necessary to comply with this Section. If such property is owned by EPA, the State, the City, SRP, or any member of the Participating Companies, such entity shall grant reasonable access for this purpose without compensation. If the Participating Companies cannot acquire access to real property required to comply with this Section, the Parties shall proceed as described in Section XIV (Access).

   c. The Participating Companies have submitted a draft GM&EP to EPA and the State with a copy to the City. The GM&EP details the Participating Companies' strategy for implementing the Groundwater Monitoring and Evaluation Program as outlined in the Statement of Work.

   d. Following EPA approval of the GM&EP and the associated Phase I SAP (described in Section VII.D.2 of this Amended Consent Decree), the Participating Companies shall implement the GM&EP except for the work for which SRP is expressly responsible under the GM&EP.

   e. Following EPA approval of the Phase I SAP associated with the GM&EP, groundwater monitoring activities required by work

plans associated with the Old Groundwater Monitoring Program shall no longer be required. In addition, following EPA approval of the Phase I SAP associated with the GM&EP, groundwater monitoring activities required by the 1993 Consent Decree shall no longer be required.

f. Within forty-five (45) days of EPA approval of the Phase I SAP associated with the GM&EP, the Participating Companies shall submit a draft Phase I Health and Safety Plan ("Phase I HASP") to EPA and the State with a copy to the City. This Phase I HASP shall be developed to accompany the activities required by the GM&EP.

g. The GM&EP will include an on-going process to evaluate the adequacy of the monitoring system and the need for new groundwater monitoring wells. The RD/RA Work Plan will include a procedure for installation of new groundwater monitoring wells in the event that it is determined that new groundwater monitoring wells are necessary.

h. Monitoring and evaluation of the groundwater pursuant to the Groundwater Monitoring and Evaluation Program shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction).

3. Ground Water Extraction System

a. When used singularly, the phrase "Ground Water Extraction System" shall mean that extraction system, including the CGTF Wellfield, which is centrally located within the NIBW Site and is connected to the existing CGTF.

b. The Participating Companies shall maintain a zone of capture both laterally and vertically within the MAU/LAU by extracting groundwater to create and maintain a hydraulic gradient toward the groundwater extraction wells using the combined pumping of the

Ground Water Extraction System and New Groundwater Extraction Systems. Maintenance of this zone of capture shall ensure that the groundwater containment Performance Standards found in Section III.A. of the Statement of Work are met. The criteria used to demonstrate capture shall be specified in the GM&EP and summarized in the Remedial Design/Remedial Action ("RD/RA") Work Plan. Such criteria shall be subject to EPA approval.

c. The City shall assist in maintaining a zone of capture to the extent provided in Sections VII.C, VII.E and VII.F of this Amended Consent Decree.

d. All Parties hereto recognize that seasonal or local fluctuations in groundwater levels may occur due to natural occurrences or the effects of localized groundwater pumping. Such seasonal or local fluctuations may occur without impairing the overall effectiveness of the remedy.

e. EPA shall determine the effectiveness of the Ground Water Extraction System by evaluating groundwater monitoring data gathered in accordance with the GM&EP and any additional relevant information.

f. If Groundwater Containment Performance Standards outlined in the Statement of Work, or performance criteria or achievement measures specified in the GM&EP are not met, the Participating Companies shall implement the contingency response actions as specified in Section 4 of the GM&EP and outlined in Section IV.A of the Statement of Work.

g. Operation of the Ground Water Extraction System shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), subject to Section XX.D.2 of this Amended Consent Decree.

4. New Groundwater Extraction Systems

a. Although each new groundwater extraction system may be referred to individually, the phrase "New Groundwater Extraction Systems" shall mean the extraction systems which were voluntarily designed and constructed at the NIBW Site. The New Groundwater Extraction Systems include:

(1) That extraction system which is located in the northern portion of the NIBW Site and is connected to the MRTF, including the MRTF Wellfield.

(2) That extraction system which is located in the vicinity of Area 7 of the NIBW Site and is connected to the existing Area 7 Groundwater Treatment Plant. Area 7 is located at the southeast corner of 75th and Second Streets in Scottsdale, Arizona. The Area 7 Groundwater Treatment Plant is located at 3703 North 75th Street.

(3) That extraction system which is located in the vicinity of Area 12 of the NIBW Site and is connected to the existing Area 12 Groundwater Treatment Plant. Area 12 is located south of McDowell Road, east of Hayden Road, north of Roosevelt Street, and west of Granite Reef Road in Scottsdale, Arizona. The Area 12 Groundwater Treatment Plant is located at 8201 East McDowell Road, Scottsdale, Arizona.

b. The Participating Companies shall maintain a zone of capture both laterally and vertically within the MAU/LAU, Area 7, and Area 12 by extracting groundwater to create and maintain a hydraulic gradient toward the groundwater extraction wells within the respective areas using the combined pumping of the Groundwater Extraction System and the New Groundwater Extraction Systems. Maintenance of these zones of capture shall ensure that the

groundwater containment Performance Standards found in Section III.A. of the Statement of Work are met. The criteria to be used to demonstrate capture shall be specified in the GM&EP and summarized in the RD/RA Work Plan. Such criteria shall be subject to EPA approval.

c. All Parties hereto recognize that seasonal or local fluctuations in groundwater levels may occur due to natural occurrences or the effects of localized groundwater pumping. Such seasonal or local fluctuations may occur without impairing the overall effectiveness of the remedy.

d. EPA shall determine the effectiveness of the New Ground Water Extraction System by evaluating groundwater monitoring data gathered in accordance with the GM&EP and any additional relevant information.

e. If Groundwater Containment Performance Standards outlined in the Statement of Work, or performance criteria or achievement measures outlined in the GM&EP are not met, the Participating Companies shall implement the contingency response actions specified in Section 4 of the GM&EP and summarized in Section IV.A. of the Statement of Work.

f. Operation of the New Groundwater Extraction Systems shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), subject to Section XX.D.2 of this Amended Consent Decree.

5. Operations and Maintenance of NIBW Treatment Plants and Monitoring/Extraction Well Networks

a. Operation and Maintenance Plans and Manuals

(1) Within sixty (60) days after EPA approval of the CGTF O&M Plan, the Participating Companies shall submit an updated Sitewide O&M Plan in accordance with Sections

III.D and IV.F of the Statement of Work. This O&M Plan shall represent a Sitewide strategy for operation and maintenance activities. The NIBW treatment plants, the groundwater monitoring well network and the groundwater extraction well network shall be operated and maintained in accordance with the EPA-approved Sitewide O&M Plan. The CGTF O&M Plan shall be incorporated into the Sitewide O&M Plan as an attachment, section or appendix.

(2) The City shall update the O&M Manual for the CGTF and the Participating Companies shall update O&M Manuals for the remaining three facilities in accordance with the EPA-approved schedules in the CGTF O&M Plan and the Sitewide O&M Plan, respectively. The O&M Manuals shall be made available at each facility for EPA and the State to review in accordance with Section IV.F.2 of the Statement of Work.

b. Sampling and Analysis Plan (SAP)

Within forty-five (45) days after EPA approval of the Sitewide O&M Plan, the Participating Companies shall submit a draft Sitewide SAP to EPA and the State with a copy to the City. This Sitewide SAP shall be developed to accompany all sampling activities associated with the Sitewide O&M Plan and shall be developed in accordance with Section IV.G of the Statement of Work.

c. With the exception of the activities for which the City and SRP are expressly responsible in Sections VII.C (City) and VII.D (SRP) of this Amended Consent Decree, the Participating Companies shall operate and maintain the monitoring well and extraction well networks in accordance with the Sitewide O&M Plan as required by the Statement of Work. Operation and maintenance of the

monitoring well and extraction well networks shall include, but not be limited to, the repair and replacement of any necessary equipment, including monitoring well pumps and network pipelines, as well as replacement of monitoring wells or extraction wells due to failure. Responsibility for response activities and costs related to releases of untreated groundwater from any extraction network facilities shall be set forth in the appropriate contingency and emergency response plans, and existing and future access agreements.

d. The Participating Companies shall finance operations and maintenance of the CGTF in accordance with this Amended Consent Decree by payments made directly to the City. For purposes of this Section VII.B.5.d, operation and maintenance costs shall mean the following:

(1) cost of utilities to operate the CGTF;

(2) cost of necessary replacement of any CGTF-related equipment and materials;

(3) all direct labor salary or hourly rate costs, including fringe benefits, of employees of the City assigned or designated to operate, maintain or supervise, whether on a full time or part time basis, the start-up of the CGTF and the subsequent operation and maintenance of the CGTF, including administrative, clerical and/or legal support services directly related thereto, but excluding overhead costs;

(4) all reasonable costs, expenses and obligations, excluding overhead costs, paid or incurred by the City, directly related to participation in start-up of the CGTF and subsequent operation and maintenance of the CGTF, including the cost of laboratory services and other actions

necessary for the City to comply with its obligations in the Amended Consent Decree related to operation of the CGTF or compliance with information requests from the Participating Companies. The City may perform water sampling and laboratory testing as reasonably necessary to operate the CGTF and comply with the Consent Decree without penalties, and the costs thereof shall be reimbursed to the City by the Participating Companies. The City shall invoice the Participating Companies for its operation and maintenance costs on a monthly basis and shall include with the invoice itemized documentation of costs incurred during the billing period. Payment shall be made to the City within 30 days of receipt of an invoice documenting the same. Interest on payments not received within the 30 day period shall be at a rate of 1% per month commencing on the 31st day following the date of a monthly invoice.

e. If the Participating Companies dispute a charge on the City's invoice, they shall pay the amount on the invoice to the City and accompany the payment with a notice of dispute. Within 20 days of the date of the notice of dispute, the Participating Companies and the City shall agree on a mechanism for resolving the dispute, such as mediation, binding arbitration or litigation. The Participating Companies may aggregate disputed charges for one calendar year and notice these for dispute with the payment of the last bill for the year. To the extent the Participating Companies prevail in the dispute, the City shall credit toward future payments any amounts due to the Participating Companies plus interest on such amounts at the rate of 10% per year from the date of payment by the Participating Companies. If arbitration or mediation is chosen, the cost of the mediator or arbitrator shall be borne by the

unsuccessful Party in the dispute. The Parties shall attempt to resolve any dispute expeditiously and in good faith.

C. Requirements for Work by the City

In addition to its obligations set forth in other applicable sections of this Amended Consent Decree, the City shall perform the following Work:

1. The City has made and shall continue to make production wells 31, 71, 72 and 75A and other City owned or operated wells within the CGTF Wellfield available for use as extraction wells in the Ground Water Extraction System. Additional City production wells having water quality levels for volatile organic compounds ("VOCs") that do not satisfy drinking water standards established under the Safe Drinking Water Act also shall be made available by the City for use in the Ground Water Extraction System if EPA determines that additional groundwater must be extracted in order to control the Zone of Ground Water Contamination pursuant to Section IX (Additional Site Work). EPA shall consult with the Parties prior to any modification to the CGTF Wellfield that involves the addition of a new well or removal of an existing well. The City shall have no obligation under this Amended Consent Decree to drill new production wells for use in the Ground Water Extraction System.

2. The City shall operate and maintain the Ground Water Extraction System in accordance with a pumping scheme which places a priority on pumping from the most contaminated wells in the CGTF Wellfield (COS71 and COS75A). The goal for minimum total annual average pumping rate shall be 6,300 gallons per minute for the CGTF Wellfield as required by the Amended ROD. The City, EPA, the State and the Participating Companies acknowledge that the CGTF was designed to treat to drinking water standards influent water with a maximum concentration of 1500 ppb of trichloroethene, and to achieve the treatment goals identified in Table VII-2 of the 1988 ROD, and also acknowledge that the CGTF, as designed, constructed and modified, is capable of meeting the cleanup

levels set forth in Table 3 of the Amended ROD.

3. The City shall be responsible for all costs of maintenance and replacement of City-owned extraction well equipment. The City shall be responsible for operation and maintenance of City-owned extraction wells. The City shall be responsible for operation of well COS 31.

4. The City shall pay the proportional utility costs to extract the amount of water that is directly served by the City to its customers during each calendar year, with a minimum of 4200 gpm, averaged over each calendar year, or 2207 million gallons of water per year. The Participating Companies shall pay the proportional utility costs to extract the amount of water that is not directly served by the City to its customers during each calendar year, with a maximum of 2100 gpm (1103 million gallons) of water per year. The City shall provide the Participating Companies with monthly records of the amounts of water (i) produced by the Ground Water Extraction System, (ii) delivered directly to its customers, and/or (iii) delivered to the recharge system or SRP's water supply system pursuant to Section VII.F.6 of this Amended Consent Decree.

5. Ownership of the CGTF has been transferred by the Participating Companies to the City, and the City has implemented and will continue to implement operation and maintenance activities at the CGTF in accordance with the CGTF O&M Plan and CGTF O&M Manual.

6. The City shall deliver to City customers water supplies containing CGTF Treated Groundwater to assist in satisfying the municipal demand in the appropriate zones of the City's water system. Nothing in this Amended Consent Decree shall require the City to violate the Safe Drinking Water Act or any other applicable State water quality standard. Any CGTF Treated Groundwater meeting applicable drinking water standards and not directly served by the City may be either returned to the aquifer by the City at its expense or delivered to the SRP water system subject to the provisions of Section VII.F.6 of this Amended Consent Decree. The City

shall pay all capital, operations and maintenance costs associated with the recharge of CGTF Treated Groundwater.

7. The City shall report any CGTF Treated Groundwater sampling results at the CGTF common sump in excess of the cleanup levels set forth in Table 3 of the Amended ROD as follows:

   a. orally to EPA, the State and SRP (if SRP is receiving water) within 48 hours of discovery and in writing within 7 days of discovery. The written submission shall include (i) a description of such an event and its cause; (ii) the period of the event, including the dates and times, and, if the situation has not been corrected, the anticipated time it is expected to continue; and (iii) steps taken or planned to reduce, eliminate and prevent re-occurrence of such an event.

   b. If such an event is confirmed and the confirmed event results in water that exceeds the cleanup levels set forth in Table 3 of the Amended ROD or any federal or State MCL for any NIBW Contaminant of Concern being distributed into the drinking water system and there is reason to believe that this event could cause a public health concern, then the community shall also be notified in accordance with the Communications Plan required by Section XII.B.10 of the Amended ROD. The procedure to be followed to confirm that a sampling result is in excess of the cleanup levels set forth in Table 3 of the Amended ROD shall be identified in the EPA-approved CGTF O&M Plan and summarized in the RD/RA Work Plan.

8. Except for operation and maintenance of groundwater extraction wells as provided in this Section or as otherwise provided in this Amended Consent Decree, nothing herein shall be construed to require payments by the City to any person or Party other than EPA and the State, in order to satisfy its obligation under this Amended Consent Decree.

9. The City shall submit Compliance Monitoring Reports as described in the CGTF O&M Plan. Such submittals are currently submitted monthly but may be submitted on a quarterly basis upon demonstration by the City that monthly compliance reports are no longer necessary.

10. To the extent practicable, the City shall put Treated Groundwater from the CGTF to beneficial use consistent with State law.

D. Requirements for Work by SRP

In addition to its obligations set forth in other applicable sections of this Amended Consent Decree, SRP shall perform the following Work:

1. SRP shall provide reasonable access to SRP property without compensation as necessary to implement the NIBW remedy. SRP shall make production well 23.3E-7.3N [COS Well 31] available for use as an extraction well in the Ground Water Extraction System in the event that SRP takes over operation of this well from the City.

2. Within thirty (30) days after EPA approval of the GM&EP, SRP shall submit a draft Phase I SAP to EPA and the State with a copy to the City. This Phase I SAP shall be developed to accompany the activities required by the GM&EP and shall be developed in accordance with Section IV.G of the Statement of Work.

3. SRP shall be responsible for operation and maintenance of extraction well PCX-1, for repair and replacement of PCX-1 well equipment, and for replacement of the well due to failure, in accordance with a separate cost sharing agreement between SRP and the Participating Companies. SRP shall be responsible for operation and maintenance of extraction well 23.6E-6.0N [the Granite Reef Well] and for repair and replacement of well equipment in accordance with a separate cost sharing agreement between SRP and the Participating Companies. If EPA requires replacement of the Granite Reef Well upon failure, and SRP has entered into a separate agreement with the Participating Companies requiring SRP to replace the Granite Reef Well, SRP shall be responsible for replacement

of the Granite Reef Well. SRP shall be responsible for the maintenance of extraction well 23.3E-7.3N [COS Well 31] and for repair and replacement of well equipment, in accordance with a separate cost sharing agreement between SRP and the City of Scottsdale.

4. SRP shall be responsible for the following GM&EP activities:

   a. SRP shall continue to have groundwater sampling, analysis and reporting obligations under the Old Ground Water Monitoring Program until the GM&EP and its associated SAP described in Sections VII.B.2.c and VII.D.2 of this Amended Consent Decree have been approved by EPA. Specifically, SRP's obligation under the Old Ground Water Monitoring Program is to continue Phase C monitoring as that term is defined in Section VIII.B. of the 1991 Consent Decree for up to eighteen (18) years from the initiation of Phase C monitoring (up to March 2013). The GM&EP shall incorporate SRP's obligation to conduct Phase C monitoring.

   b. After EPA approval of the GM&EP and the Phase I SAP, until March 2013, SRP shall collect, analyze, and report groundwater sampling data to EPA, the State and the Participating Companies with a copy to the City in accordance with Appendix E to this Amended Consent Decree.

5. Except as otherwise provided in this Amended Consent Decree, nothing herein shall be construed to require SRP to make payments to any well installation contractors, well site owners, or any Party in order to satisfy its obligations for Work under the 1991 Consent Decree or this Amended Consent Decree.

6. SRP shall submit validated groundwater data to the Participating Companies no later than forty-five (45) days following receipt of the last sample collected during a particular monitoring period.

E. Shared Work Requirements

1. Each Party hereto shall coordinate, in a manner that does not adversely affect the effectiveness of the Ground Water Extraction System or the New Groundwater Extraction Systems, the operations of any wells under its control which are not a component of the Ground Water Extraction System or the New Groundwater Extraction Systems and which could hydraulically influence the Ground Water Extraction System's or the New Groundwater Extraction Systems' zones of capture. In addition, each Party (including the United States, the State and other Parties that do not operate wells at the Site) shall, within the limits of its discretion, facilitate the effectiveness of the Ground Water Extraction System and the New Groundwater Extraction Systems by encouraging any non-Parties to operate wells in a manner that will not adversely affect the Ground Water Extraction System's or the New Groundwater Extraction Systems' zones of capture.

2. Nothing herein shall be construed to prohibit SRP or the City from using its wells in the Site to satisfy its water supply obligations, taking account of considerations such as water demand, availability of supplies, climatic conditions and capability to deliver supplies; provided, however, that if SRP or the City is able to satisfy its water supply obligations by reasonably operating its system in a manner which does not adversely impact the hydraulic effectiveness of the Ground Water Extraction System or the New Groundwater Extraction Systems, it shall do so. SRP shall invoke this paragraph only if it concludes that an actual or potential emergency, drought or other force majeure condition requires such action.

F. Central Groundwater Treatment Facility (CGTF)

1. The Participating Companies acquired real property suitable for construction of the CGTF.

2. The Participating Companies constructed the CGTF and subsequently the City and the Participating Companies modified the CGTF to treat groundwater at NIBW according to design specifications of the CGTF that

were approved by EPA.

3. If, based on data collected pursuant to the GM&EP and any other relevant Site information, EPA determines that the CGTF must be expanded or modified to control the Zone of Ground Water Contamination, to ensure that groundwater contamination is being effectively treated, or for any other reason consistent with the NCP and the purposes of this Amended Consent Decree, the procedures set forth in Section IX (Additional Site Work) shall apply.

4. As specified originally in the 1988 ROD and reiterated in the Amended ROD, the CGTF constructed by the Participating Companies includes air stripping to reduce VOC concentrations in treated water. The air stripping towers are equipped with activated carbon adsorption units designed to be capable of removing 90% of VOC air emissions. Air samples are currently and shall continue to be collected in accordance with an air emissions permit from Maricopa County. During the first 13 years of the CGTF's operation ending March 18, 2007, the carbon adsorption units shall be continuously operated, regardless of whether they are needed to comply ARARs or air emissions levels specified in OSWER Directive 9355.0-28, "Control of Air Emissions From Superfund Air Strippers at Superfund Groundwater Sites" (June 15,1989). Following this 13-year period ending March 18, 2007, the Participating Companies shall not be obligated to operate, maintain, or finance the operation or maintenance of the carbon adsorption units if the Participating Companies are able to demonstrate to EPA, based on available data, that air emissions without the use of such units meet published EPA guidance as well as ARAR emission requirements, including state and local requirements. EPA shall promptly review and make a determination based on any submission made by the Participating Companies under this Section and any other relevant information, and shall promptly issue such determination. In the event the City continues to operate the carbon adsorption units after EPA

determines that such units need not be operated, any costs incurred by the City in connection with the operation or maintenance of such units shall not qualify as Response Costs and the Participating Companies shall not be obligated to reimburse the City for operation and maintenance costs.

5. The Participating Companies transferred ownership of the CGTF to the City on March 18, 1994 in compliance with Section VII.B.3.d of the 1991 Consent Decree.

6. Treated Groundwater from the CGTF is either used as part of the City's drinking water supply system or discharged to SRP's water supply system. SRP will continue to accept Start-up Water and Excess Water treated by the CGTF that is not taken by any other Party in accordance with the "SRP North Indian Bend Wash Operational Procedures for Delivery of Start-up Water and Excess Water from the North Indian Bend Wash Groundwater Treatment Plant (CGTF)" and the 1995 "Agreement between the City and SRP Concerning Start-up Water and Excess Water from the North Indian Bend Wash Groundwater Treatment Plant (CGTF)."

   a. Excess Water and Start-up Water will be discharged to SRP's water supply system at 82nd Street and Thomas Road. The location of this SRP connection is identified on the map attached hereto as Appendix C to this Decree.

   b. The Participating Companies installed the connection facilities necessary between the CGTF and the point of discharge to SRP's water supply system. The City will operate and maintain the connection facilities. The connection facilities between the CGTF and the point of discharge to SRP's water supply system will be operated and maintained at no cost to SRP. SRP will provide access to its property, under reasonable terms and conditions, for the operation and maintenance of the connection facilities. The connection facilities will be operated so as not to permit automatic

by-pass of the CGTF or flow-through from the CGTF system, and so as to enable SRP to close the connection.

c. The City will make every effort to provide SRP at least 24 hours advance telephone notice of each discharge of Start-up or Excess Water to SRP's water supply system. Under circumstances where 24 hours advance notice is not possible, the City will provide as much advance notice as possible. SRP will inform the City as to the SRP office and telephone number to which such notice should be given. SRP shall up-date this information as appropriate. The notice must include an estimate of the quantity and quality of the water to be discharged and how long the discharge will continue. In no event will discharge to the SRP water supply system be made unless and until SRP approves the request to discharge. SRP may refuse the request to discharge water, or may direct that discharge of water cease, if there is insufficient capacity in the water supply system to receive the water, or insufficient demand for the water from SRP shareholders, or, as described in Section VII.F.6.f.(3) of this Amended Consent Decree, if water quality criteria or standards are not met. The operating capacity of the SRP water supply system at 82nd Street and Thomas Road will vary from approximately 2500 gpm to 5500 gpm. Insufficient capacity shall include periods when the water supply system is dried up for maintenance and periods when the water supply system is at full capacity due to flood conditions. SRP and the City agree to coordinate operations, and SRP will not unreasonably withhold approval of any request to discharge water to the SRP water supply system, consistent with this Section.

d. Procedures for discharge to the SRP water supply system are as follows:

(1) The City will take one representative grab sample of Start-

up Water from the CGTF at the point of discharge into the SRP water supply system within 24 hours after initiation of each discharge of Start-up Water, analyze the sample for volatile organic compounds on an expedited basis, using EPA method 524.2 or another method as approved in the SAP, and provide the results to SRP as soon as possible, but not later than 7 days after the initial discharge. While the discharge of start-up water to SRP's water supply system continues, the City will also sample the discharge every 7 days, and analyze and provide the results to SRP within 7 days after taking the sample.

(2) The City shall not discharge Start-up Water that causes a violation of state water quality standards in the SRP water supply system. The terms of any monitoring required to show compliance with state water quality standards will be set forth in a separate agreement between the City and SRP.

e. The discharge of water to SRP's water supply system under this Section VII.F.6 will not be subject to any state, federal, or local permitting requirements, pursuant to CERCLA Section 121(e), 42 U.S.C. § 9621(e). The City will be solely responsible for complying with the state water quality standards, and the requirements set forth in Section VII.F.6.f below.

f. SRP may direct that discharge of water to its water supply system cease or stop the discharge by closing the connection facilities to the SRP water supply system, if:

(1) any sampling results obtained pursuant to Section VII.F.6.d.(1) (Start-up Water) indicate that at the point of discharge to the SRP water supply system the following criteria are not being met:

trichloroethene (TCE)	- 20 ppb
1,1,1,-trichloroethane (TCA)	- 200 ppb
l,l,-dichloroethene (DCE)	- 20 ppb
perchloroethene (PCE)	- 20 ppb
chloroform	- 100 ppb

These discharge standards shall represent daily maximum concentration limits. Average monthly concentrations for any long-term discharge shall meet the cleanup standards in Table 3 of the Amended ROD;

(2) any sampling of Start-up Water that is required pursuant to Section VII.F.6.d.(1) (Start-up Water) indicates that the Start-up Water discharge has caused a violation of State water quality standards;

(3) any sampling of Excess Water in accordance with the EPA-approved Operation and Maintenance Plan for the CGTF indicates that the Excess Water does not meet the cleanup levels set forth in Table 3 of the Amended ROD or federal MCLs adopted under the Safe Drinking Water Act, 42 U.S.C. §§ 300f-300j-11, for NIBW Contaminants of Concern, or does not meet applicable NPDES discharge standards and applicable State water quality standards for other contaminants;

(4) the City discharges without prior SRP approval;

(5) there is insufficient capacity in the SRP water supply system to receive the water; or

(6) there is insufficient demand for the water from SRP shareholders.

g. SRP may stop the discharge by closing the connection facilities to

the SRP water supply system if the City fails to cease discharge upon SRP's direction.

h. If SRP refuses a request to discharge, directs that discharge cease, or stops the discharge by closing the connection facilities, the provisions of Section XXIV (Force Majeure) may apply.

i. SRP will not be liable for any charges or penalties that may arise from SRP's acceptance of water pursuant to this Amended Consent Decree, and SRP will not be required to make any payment for receipt of such water. Neither the City nor the Participating Companies shall be required to make any payment for discharging to SRP's water supply system.

j. SRP will use its best efforts to reduce pumping from SRP wells within the City of Scottsdale in a given year by the amount of Excess Water received and used by SRP shareholders in that year; provided, that SRP will not be required to incur additional groundwater production costs to achieve the reduction in pumping.

k. To the extent practicable, SRP will deliver all water accepted from CGTF to SRP shareholders and other users entitled to water from SRP for beneficial use, consistent with State law.

7. Section XII.B.2.g. of the Amended ROD requires that the CGTF O&M Plan be revisited to ensure compliance with requirements of the Amended ROD. Accordingly, the CGTF O&M Plan has been revised. The overall compliance monitoring requirements for the CGTF will be identified in the CGTF O&M Plan.

8. Operation of the CGTF shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), subject to Section XX.D.2 of this Amended Consent Decree.

G. Miller Road Treatment Facility (MRTF)

1. The Participating Companies shall use the MRTF to treat groundwater for the NIBW Contaminants of Concern as set forth in this Amended Consent Decree.

2. The Participating Companies shall be responsible for the operation and maintenance of the MRTF in compliance with the terms of this Amended Consent Decree, the Statement of Work and the MRTF Section of the Sitewide O&M Plan.

3. If, based on data collected pursuant to the GM&EP and any other relevant Site information, EPA determines that the MRTF must be expanded or modified to control the Zone of Ground Water Contamination, to ensure that groundwater contamination is being effectively treated, or for any other reason consistent with the NCP and the purposes of this Amended Consent Decree, the procedures set forth in Section IX (Additional Site Work) shall apply.

4. Air Quality

   a. The Participating Companies shall conduct air sampling in accordance with the EPA-approved O&M Plan for the MRTF that is required by Section XII.B.3.e. of the Amended ROD. The O&M Plan for the MRTF shall be submitted for approval in accordance with the Statement of Work.

   b. Air emissions must meet the substantive requirements of federal and State ARAR emissions requirements as defined in the Amended ROD, including Maricopa County air emissions permit requirements.

5. Water extracted from PCX-1 shall be treated at the MRTF and either delivered directly to the SRP water supply system at the Arizona Canal or used by the Arizona American Water Company in exchange for use by SRP of an equal volume of an alternative source of water provided to SRP by the Arizona American Water Company. SRP shall accept PCX-1 water treated by the MRTF or exchange water in accordance with the "Amended

and Restated Water Exchange and Treatment Agreement Between the Arizona-American Water Company and the Salt River Valley Water Users' Association," and the "Agreement for the Operation and Costs of PCX-1."

6. SRP shall accept water treated at the MRTF subject to the following terms and conditions:

   a. Water will be discharged to the SRP water supply system at the Arizona Canal adjacent to the MRTF.

   b. To the extent practicable, SRP will deliver all water accepted from the MRTF to SRP shareholders and other users entitled to water from SRP for beneficial use, consistent with State law.

   c. The Participating Companies will operate and maintain the MRTF and the connection facilities between the MRTF and the point of discharge to SRP's water supply system (Arizona Canal) at no cost to SRP. SRP will provide access to its property, under reasonable terms and conditions, for the operation and maintenance of the connection facilities. The MRTF and connection facilities will be operated so as not to permit by-pass of the MRTF. In addition, the Participating Companies shall ensure that SRP will itself be able to close the connection.

   d. On or before February 1 of each year, the Participating Companies will notify SRP of the quantity and duration of the anticipated discharges into the Arizona Canal from the MRTF for the following year ("Annual Plan"). The Participating Companies will, if possible, provide SRP at least 24 hours advance telephone notice of any significant deviation from any planned discharge to the SRP water supply system. Under circumstances where 24 hours advance notice is not possible, the Participating Companies will provide as much advance notice as possible. All discharges from the MRTF will be in accordance with the Annual Plan or

separate permission from SRP in cases of deviation from the Annual Plan.

e. SRP will not unreasonably withhold approval of any request to discharge water to the SRP water supply system from the MRTF consistent with Section VII.G. of this Amended Consent Decree.

7. The Participating Companies will not discharge water that fails to comply with the treatment criteria set forth in Section XX.A. of this Amended Consent Decree.

8. SRP may refuse to approve a request to discharge water to its water supply system, or may direct that previously-approved discharge cease, or may stop the discharge itself by closing the connection facilities to the SRP water supply system, under any of the following circumstances:

a. any sampling results obtained pursuant to the EPA-approved O&M Plan indicate that at the point of discharge to the SRP water supply system the following criteria are not being met for any water:

trichloroethene (TCE)	- 5 ppb
1,1,1,-trichloroethane (TCA)	- 200 ppb
l,l,-dichloroethene (DCE)	- 7 ppb
perchloroethene (PCE)	- 5 ppb
chloroform	- 20 ppb[1];

b. any sampling results obtained pursuant to the MRTF NPDES permit indicate that the sampling results at the point of compliance exceed any MRTF NPDES permit limitation;

c. the Participating Companies discharge without prior SRP approval;

d. there is insufficient capacity in the SRP water supply system to receive the water;

[1] Chloroform produced as a by-product of municipal water supply disinfection is exempt from the treatment standard for chloroform identified in Table 3 of the Amended ROD. This does not exempt municipal suppliers from the requirements for chloroform under the federal Safe Drinking Water Act, 42 U.S.C. §§ 300f to 300j.

e. there is insufficient demand for the water from SRP shareholders; or

f. any sampling results show that the discharge has or will cause or contribute to a violation of applicable water quality standards.

9. Participating Companies shall maintain, or cause to be maintained, an NPDES permit for discharges from the MRTF to the SRP water supply system. The Participating Companies may discharge water to SRP's water supply system without first applying for or obtaining other federal, state, or local permits, consistent with Section 121(e) of CERCLA, 42 U.S.C. § 9621(e). However, the Participating Companies shall remain responsible for complying with all applicable federal, state and local legal requirements that otherwise would be required as part of such permits.

10. The Participating Companies shall comply with the monitoring requirements established for the MRTF in the Sitewide O&M Plan and the MRTF NPDES Permit.

11. If, pursuant to this Section, SRP refuses a request to discharge, directs that discharge cease, or stops the discharge by closing the connection facilities, the provisions of Section XXIV (Force Majeure) may apply.

12. SRP shall identify to the Participating Companies in writing the name, address and telephone number of the SRP official to whom any notice required by this Section shall be given. SRP shall update this information as appropriate.

13. The Participating Companies shall report any sampling results in excess of the cleanup levels set forth in Table 3 of the Amended ROD as follows:

a. orally to EPA, the State and SRP within 48 hours of discovery and in writing within 7 days of discovery. The written submission shall include: (i) a description of such an event and its cause; (ii) the period of the event, including the dates and times, and, if the situation has not been corrected, the anticipated time it is expected to continue; and (iii) steps taken or planned to reduce, eliminate and prevent re-occurrence of such an event.

b. If such an event is confirmed and the confirmed event results in water that exceeds the cleanup levels set forth in Table 3 of the Amended ROD or any federal or State MCL for any NIBW Contaminant of Concern

being distributed into the drinking water system and there is reason to believe that this event could cause a public health concern, then the community shall also be notified in accordance with the Communications Plan required by Section XII.B.10 of the Amended ROD. The procedure to be followed to confirm that a sampling result is in excess of the cleanup levels set forth in Table 3 of the Amended ROD shall be identified in the EPA-approved MRTF Section of the Sitewide O&M Plan and summarized in the RD/RA Work Plan.

14. Operation of the MRTF shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), subject to Section XX.D.2 of this Amended Consent Decree.

H. Area 7 Groundwater Treatment Plant

1. On December 2, 1997, Siemens implemented the October 1997 Revision to the plan entitled "Area 7 MAU Groundwater Response Action Design Report." Siemens voluntarily constructed the Area 7 plant on property located at 3703 North 75th Street in Scottsdale, Arizona ("Area 7 Plant"). The Participating Companies shall use the Area 7 Plant to treat groundwater for NIBW Contaminants of Concern as set forth in this Amended Consent Decree.

2. In accordance with the Amended ROD, one new extraction well and one new recharge well have been installed in the vicinity of Area 7.

3. Treated Groundwater from the Area 7 Plant is used to recharge the UAU via recharge wells in the vicinity of Area 7. Treated Groundwater may be discharged to the City's sanitary sewer system, subject to existing or future access agreements or other written approval by the City.

4. To the extent practicable, the Participating Companies shall put Treated Groundwater from the Area 7 Plant to beneficial use, consistent with State law.

5. If, based on data collected pursuant to the GM&EP and any other relevant Site information, EPA determines that the Area 7 Plant must be expanded or modified to control the Zone of Ground Water Contamination, to ensure that groundwater contamination is being effectively treated, or for any other reason consistent with the NCP and the purposes of this Amended Consent Decree, the procedures set forth in Section IX (Additional Site Work) shall apply.

6. Air Quality

a. The Participating Companies shall conduct air sampling in accordance with the EPA-approved O&M Plan for the Area 7 Plant that is required by Section XII.B.4.f. of the Amended ROD. The O&M Plan for the Area 7 Plant shall be submitted for approval in accordance with the Statement of Work.

b. Air emissions must meet the substantive requirements of federal and State ARARs emissions requirements as defined in the Amended ROD, including Maricopa County air emissions permit requirements.

7. The overall compliance monitoring requirements for the Area 7 Plant shall be established in the EPA-approved O&M Plan for the Area 7 Plant that is required by Section XII.B.4.f of the Amended ROD. The Area 7 Plant O&M Plan shall be submitted for approval in accordance with the Statement of Work. The procedure to be followed to confirm that a sampling result is in excess of the cleanup levels set forth in Table 3 of the Amended ROD shall be identified in the Area 7 Plant O&M Plan and summarized in the RD/RA Work Plan.

8. If any sampling results show that the recharge has or will cause or contribute to a violation of applicable federal or State recharge standards or requirements, recharge shall cease and the Participating Companies shall:

a. notify EPA and the State;

b. develop a corrective action plan to correct the treatment problem.

Recharge shall not resume until the Participating Companies demonstrate that the Area 7 Plant can effectively meet the applicable State water quality standards.

9. Operation of the Area 7 Plant shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), subject to Section XX.D.2 of this Amended Consent Decree.

I. Area 12 Groundwater Treatment Plant

1. On September 12, 1997, Motorola implemented the plan entitled "Area 12 Middle Alluvium Unit (MAU) Groundwater Source Control Work Plan", dated February 6, 1997. Motorola voluntarily constructed the Area 12 plant on Motorola property located at 8201 East McDowell Road in Scottsdale, Arizona ("Area 12 Plant"). The Participating Companies shall use the Area 12 Plant to treat groundwater for NIBW Contaminants of Concern as set forth in this Amended Consent Decree.

2. Water treated at the Area 12 Plant shall be delivered to the SRP water supply system in accordance with a separate agreement between Motorola and SRP.

3. SRP shall accept Treated Groundwater from the Area 12 Plant subject to the following terms and conditions:

   a. Water treated at the Area 12 Plant shall be discharged to the SRP water supply system at SRP lateral 1-1.5.

   b. To the extent practicable, SRP shall deliver all water accepted from the Area 12 Plant to SRP shareholders and other users entitled to water from SRP for beneficial use, consistent with State law.

   c. Motorola will operate and maintain the Area 12 Plant and connection facilities between the Area 12 Plant and the point of discharge to SRP's water supply system at no cost to SRP. SRP shall provide access to its property, under reasonable terms and conditions, for the operation and maintenance of the connection facilities. The Area 12 Plant and connection facilities will be operated so as not to permit by-pass of the Area 12 system and so as to enable SRP to close the connection.

   d. On or before February 1st of each year, Motorola shall provide a description of the quantity and duration of the anticipated discharge into the SRP water supply system from the Area 12 Plant for the following year ("Annual Plan"). Motorola will, if possible, provide SRP at least 24 hours advance telephone notice of any deviation from any planned discharge to the SRP water supply system. Under circumstances where 24 hours advance notice is not possible, Motorola will provide as much advance notice as possible.

   e. All discharges from the Area 12 Plant will be in accordance with the Annual Plan or pursuant to separate permission from SRP in cases of deviation from the Annual Plan. SRP will not unreasonably withhold approval of any request to discharge water to the SRP water supply system from the Area 12 Plant consistent with this Section VII.I. Motorola will obtain SRP's verbal approval before initiating discharge.

4. Motorola will not discharge water that fails to comply with the treatment criteria set forth in Section XX.C of this Amended Consent Decree.

5. SRP may refuse to approve a request to discharge water to its water supply system, or may direct that a previously-approved discharge cease, or may stop the discharge itself by closing the connection facilities to the SRP water supply system, under any of the following circumstances:

   a. any sampling conducted pursuant to the EPA-approved O&M Plan indicates that at the point of compliance the water exceeds any Area 12 NPDES permit limitation. For TCE, averaging of sampling results is permitted, if specifically provided for in the NPDES permit;

   b. Motorola discharges without prior SRP approval;

   c. there is insufficient capacity in the SRP water supply system to receive the water;

   d. there is insufficient demand for the water from SRP shareholders; or

   e. any sampling results show that the discharge has or will cause or contribute to a violation of applicable water quality standards.

6. Motorola shall maintain an NPDES permit for discharges from the Area 12 Plant to the SRP water supply system. Motorola may discharge water to SRP's water supply system without first applying for or obtaining other federal, state, or local permits, consistent with Section 121(e) of CERCLA, 42 U.S.C. § 9621(e). However, Motorola shall remain responsible for complying with all applicable federal, state and local legal requirements that otherwise would be required as part of such permits.

7. Motorola shall operate the Area 12 Plant in accordance with the Area 12 Section of the EPA-approved Sitewide O&M Plan and the NPDES Permit. The procedure to be followed to confirm that a sampling result is in excess of the cleanup levels set forth in Table 3 of the Amended ROD shall be identified in the Area 12 Plant Section of the Sitewide O&M Plan and summarized in the RD/RA Work Plan.

8. If, pursuant to this section, SRP refuses a request to discharge, or directs that discharge cease, the provisions of Section XXIV (Force Majeure) may apply.

9. SRP shall identify to Motorola in writing the name, address and telephone number of the SRP official to whom any notice required by this section shall be given. SRP shall update this information as appropriate.

10. Operation of the Area 12 Plant shall continue until EPA issues Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), subject to Section XX.D.2 of this Amended Consent Decree.

VIII. SCHEDULE OF THE WORK

A. Except where noted otherwise, all dates referred to in the following schedule are calendar days; however, should a deadline fall on a weekend or a State or Federal holiday, the deadline shall be construed to continue to the next business day.

B. Until such time that the GM&EP required by this Amended Consent Decree and the Statement of Work is approved by EPA, routine monitoring of all wells comprising the Old Ground Water Monitoring Program shall continue to proceed in accordance with the following three phases:

Phase A: By October 1, 1990, for all wells installed and completed by that date. All subsequently completed wells will be incorporated into the program upon completion of each such well.

Phase B: Upon transfer of the Plant to the City in accordance with Section VII.C.5 of the 1991 Consent Decree.

Phase C: One year following the initiation of Phase B monitoring.

All Parties acknowledge that Phases A and B have been completed and Phase C monitoring is ongoing.

In 1992, SRP submitted a Sampling and Analysis Plan ("SAP"), a Quality Assurance/Quality Control ("QA/QC") Plan and a Worker Health and Safety Plan applicable to monitoring well sampling and analysis during phases A, B and C. EPA approved these plans in November 1992. SRP shall continue to follow the procedures established in these EPA-approved plans until the revised Phase I SAP required by this Amended Consent Decree and the Statement of Work is approved by EPA.

C. Design Schedule. If design of a replacement plant or modifications of any of the existing treatment plants or extraction systems is required, such design shall, at EPA's discretion, follow the design procedures set forth in Section IV.C of the Statement of Work.

D. The City has prepared and submitted an O&M Plan for the CGTF. The CGTF O&M Plan shall be incorporated into the Sitewide O&M Plan in accordance with Section VII.B.5.a.(1) of this Amended Consent Decree. The CGTF O&M Plan will describe the

operating procedures, compliance monitoring procedures, and response procedures for the CGTF.

E. The Participating Companies shall submit to EPA an O&M plan for Area 7, Area 12, the MRTF, the extraction well networks and the monitoring well network (Sitewide O&M Plan). Such Sitewide O&M Plan shall be submitted for approval in accordance with the Statement of Work.

F. The City shall sample the effluent from the CGTF as well as other CGTF quality control samples in accordance with the CGTF O&M Plan, and the Phase II SAP as provided for in the Statement of Work. The Sitewide O&M Plan shall be submitted in accordance with the schedule included in Section V of the Statement of Work. Requirements for such plans are set forth in Sections IV.F and IV.G of the Statement of Work.

G. The Participating Companies shall sample the effluent from the MRTF, Area 7 Plant and Area 12 Plant as well as other quality control samples at these facilities in accordance with the Sitewide O&M Plan, and the Phase II SAP as provided for in the Statement of Work. These plans shall be submitted in accordance with the schedule included in Section V of the Statement of Work. Requirements for such plans are set forth in Sections IV. F and IV.G of the Statement of Work.

H. In the event the EPA Project Coordinator suspends the Work or any other activity at the Site pursuant to Section XIII.B of this Amended Consent Decree, EPA will extend the compliance schedule of this Amended Consent Decree for the minimum period of time, if any, necessary to perform the Work.

I. Any member of the Participating Companies, SRP, or the City may propose an extension to the Work schedule pursuant to Section XXVII (Modification) of this Amended Consent Decree.

IX. ADDITIONAL SITE WORK

A. If based upon data collected pursuant to the GM&EP and any additional information EPA deems relevant, EPA determines that the Ground Water Extraction System and/or the New Groundwater Extraction Systems are not withdrawing a sufficient volume of groundwater to create or maintain the zones of capture, or is otherwise inadequate to remediate the Zone of Ground Water Contamination in accordance with the Performance Standards or that the CGTF, the MRTF, the Area 7 Plant and/or the Area 12 Plant does not have sufficient capacity to treat the volume of water that should be extracted in order

to maintain the zone of capture, EPA may, if consistent with the NCP and any EPA guidance published in the Federal Register, reopen the Amended ROD for potential amendment. Any such amendment shall adhere to the NCP and any other requirements that are applicable to ROD amendments.

B. To the extent required by Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), and any applicable regulations, EPA shall review the remedial action at the Site at least every 5 years, to assure that human health and the environment are being protected by the remedial action implemented hereunder. Until such time as EPA certifies the completion of the remedial action pursuant to Section XXXIX of this Amended Consent Decree, EPA may request that the Participating Companies submit a plan for additional data collection or data analysis necessary to complete such review. Following submission of the plan, EPA shall complete its review and determine if Additional Site Work is necessary to achieve the purpose of this Amended Consent Decree. Thereafter, the Parties shall proceed according to Section IX.C below.

C. If the Amended ROD is further amended to require expansion of the CGTF, the MRTF, the Area 7 Plant and /or the Area 12 Plant or other major changes in implementation of remedial activity at the Site, or if EPA determines, on the basis of the provisions of Section IX.B (Five Year Review) or other relevant information that Additional Site Work is necessary at the Site to achieve the purpose of this Amended Consent Decree, EPA shall explain the basis for the proposed Additional Site Work and it shall initiate negotiations with the Parties concerning such additional activities. This informal negotiation period shall continue up to 60 days, so long as the Parties are participating in good faith negotiations, unless the Parties agree to a longer period. After this informal negotiation period, the provisions of Section XXV.B (Dispute Resolution) shall apply.

D. Any Additional Site Work covered by this Section shall be set forth in a modification to this Amended Consent Decree that is executed by all Parties and approved by the Court pursuant to Section XXVII (Modification).

E. Nothing in this Section shall preclude the Parties from making other modifications without Court approval pursuant to Section XXVII.F (Modification).

X. REPORTING AND APPROVALS/DISAPPROVALS

A. Progress Reports

1. Current Reporting Schedule

In accordance with the 1991 Consent Decree, the Participating Companies shall continue the submission of semi-annual progress reports. All semi-annual progress reports shall be submitted to EPA and the State on a semiannual basis by the 15th of July and January for the Work done during the preceding six-month period and planned for the current six-month period. This schedule shall remain in effect until the GM&EP required by the Statement of Work has been approved. At such time, the reporting requirements in the GM&EP shall become effective as identified in Section X.A.2.a and X.A.2.c below.

2. Subsequent Reporting Schedule

   a. Compliance monitoring data shall be collected by the Participating Companies in accordance with the Statement of Work, the Sitewide O&M Plan and the GM&EP. The Participating Companies shall submit a Quarterly Report that includes electronic groundwater data, an associated narrative summary, and compliance monitoring data for the MRTF, Area 7 Plant and Area 12 Plant.

   b. Compliance monitoring data shall be collected in accordance with the CGTF O&M Plan by the City. Such compliance monitoring data shall be submitted in Compliance Monitoring Reports as required by Section VII.C.9 of this Amended Consent Decree.

   c. The Annual Site Monitoring Reports described in the GM&EP shall be submitted annually.

   d. Quarterly Reports, Compliance Monitoring Reports and Annual Site Monitoring Reports shall be submitted in accordance with the schedule in Section V of the Statement of Work.

3. This schedule shall remain in effect until EPA issues Certification of Completion of the Remedial Action pursuant to Section XXXIX (Termination and Satisfaction) of this Amended Consent Decree, unless EPA agrees to a modification of the schedule.

4. The narrative summary accompanying the Quarterly Report submitted by the Participating Companies pursuant to paragraph 2.a above shall identify activities projected to be commenced or completed during the next reporting period and any problems that have been encountered or are anticipated by the Party in

commencing or completing the activities.

B. Reports, Plans, and Other Items

1. Any reports, plans, specifications (including discharge or emission limits), schedules, appendices, and attachments required or established by this Amended Consent Decree, the Amended ROD, or the Statement of Work are, upon approval by EPA, incorporated into this Amended Consent Decree. All such documents are identified in Appendix F. If there is any noncompliance with such EPA-approved reports, plans, specifications (including discharge or emission limits), schedules, appendices, or attachments, the provisions of Section XXIII (Stipulated Penalties) shall be applicable. Any such determination of noncompliance with which the Participating Companies, SRP, or the City disagrees shall be deemed a dispute and subject to the provisions of Section XXV (Dispute Resolution).

2. Any objections by EPA shall be in writing and shall include an explanation by EPA of why the plan, report, or item has not been approved.

3. If EPA objects to any plans or reports (other than reports not requiring EPA approval pursuant to the Statement of Work), or other items required to be submitted to EPA for approval pursuant to Section VII (Work to be Performed), Section VIII (Schedule of Work), Section XII (Quality Assurance/Quality Control), or Section XV (Assurance of Ability to Complete Work), the Participating Companies, SRP, or the City shall have 30 days from the receipt of EPA's objections to respond to such objections and resubmit the plan, report, or item for EPA approval, except that the period for the response may be extended by mutual agreement of EPA and the responding Party.

4. In the event that EPA determines that any resubmitted plan, report or item is in noncompliance with this Amended Consent Decree or the NCP, and gives the written notice described in Section XXIII.A.2 of this Amended Consent Decree, the Parties shall proceed as provided in Section XXIII of this Amended Consent Decree. Any such determination of noncompliance with which the Participating Companies, SRP, or the City disagrees shall be deemed a dispute, and subject to the provisions of Section XXV (Dispute Resolution). In the event that EPA's objections to the plan, report or other item have been addressed to EPA's reasonable satisfaction by any resubmission permitted under this Section, then

the Participating Companies, SRP, or the City shall not be deemed to be in violation of this Amended Consent Decree and any stipulated penalties under Section XXIII.A.1 of this Amended Consent Decree shall not be deemed to have accrued.

5. A copy of any report, plan or other item submitted to EPA pursuant to this Section X.B shall be provided to the State at the same time.

6. EPA and the State shall receive two copies of each document, unless more (or less) than two are requested by the EPA or State Project Coordinators. Electronic deliverables shall also be provided upon request.

7. Upon request, EPA and the State shall make available to the Participating Companies, to the extent allowable by law, copies of work plans and other documents prepared by EPA or the State and their contractors relating to activities for which EPA or the State intends to seek reimbursement under this Decree. To the extent practicable, such work plans and other documents shall be made available to the Participating Companies prior to implementation of the activities identified in such documents.

C. State-EPA Consultation

Prior to approving any reports, plans, specifications, schedules, appendices and attachments required or established by this Decree, EPA shall provide the State with a reasonable opportunity to review and comment on such reports and other items. In addition, EPA will confer with the State regarding Section IX (Additional Site Work), Section XV (Assurance of Ability to Complete the Work), Section XX.C (Technical Impracticability), enforcement of this Decree pursuant to Section XXIII (Stipulated Penalties) or otherwise, Section XXIV (Force Majeure), Section XXV (Dispute Resolution), Section XXVII (Modification) and Section XXXIX (Termination and Satisfaction).

XI. WORKER HEALTH AND SAFETY PLAN

The Worker Health and Safety Plans required pursuant to this Amended Consent Decree shall satisfy any applicable OSHA requirements.

XII. QUALITY ASSURANCE/QUALITY CONTROL

A. Quality Assurance/Quality Control Plans, including but not limited to Field Sampling

Plans (FSP) and Quality Assurance Project Plans (QAPP) known collectively as the SAP, required pursuant to this Amended Consent Decree, shall be prepared in accordance with the current EPA guidance. The SAP required by this Amended Consent Decree shall be prepared in accordance with Section IV.G of the Statement of Work.

B. In collecting and analyzing any samples pursuant to this Amended Consent Decree, the Parties shall use only Arizona Department of Health Services licensed laboratories that adhere to quality assurance procedures in accordance with the QAPPs submitted pursuant to this Amended Consent Decree. Laboratory selection shall follow procedures identified in Section IV.G of the Statement of Work. In order to provide quality assurance and maintain quality control regarding all samples collected pursuant to this Amended Consent Decree, each Party, as to the laboratory work for which it is responsible, shall:

1. Ensure (contractually or otherwise) that all laboratories used for analysis of samples taken pursuant to this Amended Consent Decree provide for reasonable access of EPA personnel and EPA authorized representatives to assure the accuracy of laboratory results related to the work.
2. Ensure that laboratories used for analysis of samples taken pursuant to this Amended Consent Decree perform all analyses according to methods deemed satisfactory by EPA in advance of the analysis. Analytical methods will be approved by EPA in the SAPs.
3. Ensure that all laboratories used for analysis of samples taken pursuant to this Amended Consent Decree utilize an EPA or EPA equivalent quality assurance program. As part of the quality assurance program and upon reasonable request by EPA, such laboratories shall perform at their expense analyses of samples provided by EPA to demonstrate the quality of each laboratory's data. EPA may provide to each laboratory a maximum of four aqueous samples per year for analysis by gas chromatography methods.
4. Submit a quality assurance report to EPA on an annual basis. These reports shall contain information that demonstrates whether the laboratories used are complying with this Section and the quality assurance plans set forth in the SAP.

C. The Parties agree not to contest EPA' s authority to conduct field audits to verify compliance with quality assurance requirements.

XIII. PROJECT COORDINATOR

A. By the Effective Date of this Amended Consent Decree, EPA, the State, the City, SRP and the Participating Companies shall each designate a Project Coordinator for the Work undertaken by it or under its supervision. The Project Coordinators will monitor the progress of the Work and coordinate communication among all Parties. The EPA Project Coordinator shall have the authority vested in the Remedial Project Manager and the On-Scene Coordinator by the NCP.

B. The EPA Project Coordinator shall have the authority to stop the Work, or any other activity at the Site which, in the opinion of the EPA Project Coordinator, may present or contribute to an endangerment to public health, welfare, or the environment, or cause or threaten to cause the release of hazardous substances from the Site. The Project Coordinator of a Party shall have authority to stop any activity for which that Party is responsible under this Amended Consent Decree; provided, however, that stoppage of any activity by the Project Coordinator of a Party other than EPA shall not of itself alter the requirements, including schedule for performance of the Work under this Amended Consent Decree.

C. Except as otherwise provided in this Amended Consent Decree, the Project Coordinators do not have the authority to modify in any way the terms of this Amended Consent Decree, including Appendix A or any approved design or construction plans. The absence of any Project Coordinator from the Site shall not be cause for stoppage of the Work. Any Party may change its respective Project Coordinator by notifying other Parties in writing at least 10 days prior to the change.

D. Any Party's Project Coordinator may assign another representative, including another contractor, to serve as a Site representative for oversight of performance of daily operations during remedial activities.

E. The EPA Project Coordinator may assign other representatives, including other EPA employees or contractors, to serve as a Site representative for oversight of performance of daily operations during remedial activities, not including authority to stop the Work.

F. Prior to invoking formal dispute resolution procedures, any unresolved dispute arising between an EPA Site representative and the Participating Companies', SRP's, or the City's Site representative or Project Coordinator shall be discussed with the EPA Project Coordinator.

XIV. ACCESS

A. To the extent that access to or easements over property within or outside the boundaries of the Site but not owned or controlled by a member of the Participating Companies is required for performance of Work under this Amended Consent Decree, the Participating Companies shall use their best efforts to obtain access agreements from the present owners or from persons who have control over such property within 90 days prior to the date access is required to comply with this Amended Consent Decree. Such access agreements shall provide access under reasonable terms and conditions to any Party and its authorized representatives. In the event that access agreements are not obtained at least 45 days prior to the date access is required, the Participating Companies shall notify EPA regarding both the lack of, and efforts to obtain, such agreements.

B. To the extent that access to or easements over property within or outside the boundaries of the Site but not owned or controlled by a member of the Participating Companies or SRP is required for performance of Additional Site Work under this Amended Consent Decree, the Participating Companies or SRP, whichever is responsible for obtaining access, shall use best efforts to obtain access agreements from the present owners or from persons who have control over such property within 90 days prior to the date access is required to comply with this Amended Consent Decree. Such access agreements shall provide access under reasonable terms and conditions to any Party and its authorized representatives. In the event that access agreements are not obtained at least 45 days prior to the date access is required, the Party or Parties responsible for obtaining access shall notify EPA regarding both the lack of, and efforts to obtain, such agreements.

C. If necessary, within the exercise of its discretion and consistent with its legal authority, EPA agrees to use its best efforts to assist the Party or Parties responsible for obtaining access in obtaining such access. The force majeure provisions of Section XXIV shall govern any delays caused by difficulties in obtaining the necessary access agreements. In the event EPA exercises its access authorities under Section 104(e) or Section 104(j) of CERCLA, in order to obtain access for the performance of actions required under this Amended Consent Decree, the Party or Parties responsible for obtaining access shall reimburse the United States for costs incurred in the exercise of such authorities, provided such costs are not inconsistent with the NCP.

D. In the event that the owner of the MRTF files for bankruptcy or materially fails to operate or maintain the MRTF in a manner consistent with the remedy and this Amended Consent Decree, then the Participating Companies shall use their best efforts to acquire

the MRTF. For the purposes of this paragraph, "best efforts" includes the payment of reasonable sums of money in consideration of the acquisition. In the event that EPA determines that the owner of the MRTF has filed for bankruptcy or has materially failed to operate or maintain the MRTF in a manner consistent with the remedy and this Amended Consent Decree, and the Participating Companies disagree with that determination, it shall be the Participating Companies' burden to demonstrate otherwise.

E. In the event EPA acquires an interest in real property under Section 104(j) of CERCLA, or the United States otherwise exercises its authority to acquire an interest in real property, for the performance of Work, or Additional Site Work that involves use of the MRTF, the Participating Companies shall reimburse the United States for costs incurred in the exercise of such authorities, provided such costs are not inconsistent with the NCP. The Participating Companies acknowledge that costs incurred pursuant to this paragraph are response costs pursuant to 42 U.S.C. § 9607.

F. After the Effective Date of this Amended Consent Decree, the Participating Companies, SRP, and the City shall ensure that the United States, the City, the State, and their representatives, including contractors, shall have access at all reasonable times to any property within the Site that is owned or controlled by any member of the Participating Companies, SRP, or the City, and is necessary for the performance of the Work. In the event any member of the Participating Companies, SRP, or the City transfers some or all of such property located within the boundaries of the Site to a third party after the Effective Date of this Amended Consent Decree, that entity shall: (a) assure that the instrument effecting the conveyance or transfer of title appends a copy of the 1991 Consent Decree, the Amended Consent Decree, the 1988 ROD, the Amended ROD, and the listing of the Site on the NPL; and (b) use its best efforts to assure access under reasonable conditions to the property of the third party. The Participating Companies shall ensure that the United States, the State and their representatives shall have access at all reasonable times to the MRTF.

G. Any Party desiring to obtain access pursuant to Section XIV.F of this Amended Consent Decree shall notify the appropriate Party's Project Coordinator at least 24 hours in advance; provided, however, that EPA may determine in accordance with CERCLA Section 104(e) that less notice by EPA is necessary. Any such Party who obtains access shall comply with all applicable provisions of the Worker Health and Safety Plan for that activity.

H. Access under this Section shall be permitted for purposes of conducting any activity authorized by this Amended Consent Decree, including, but not limited to:

1. Monitoring the progress of activities taking place;
2. Verifying any data or information submitted to EPA or the State;
3. Conducting investigations relating to contamination at or near the Site;
4. Obtaining samples at or near the Site; and
5. Inspecting and copying records, operating logs, contracts, or other documents utilized to assess the Participating Companies', SRP's or the City's compliance with this Amended Consent Decree.

I. Nothing in this Section shall limit the access authority of EPA under Section 104(e) of CERCLA.

J. If EPA determines that land use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the Amended ROD, ensure the integrity and protectiveness thereof, or ensure non-interference therewith, the Parties shall cooperate with EPA's and the State's efforts to secure such governmental controls.

K. Notwithstanding any provisions of this Amended Consent Decree, the United States and the State retain all of their access authorities and rights, as well as all of their rights to require land use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

XV. ASSURANCE OF ABILITY TO COMPLETE WORK

Following review of information submitted to EPA by the Participating Companies and SRP, the United States has determined that the members of the Participating Companies and SRP have demonstrated their financial ability to complete the Work. Each year, by the anniversary of the Effective Date of this Amended Decree, each member of the Participating Companies and SRP shall provide to EPA a copy of its annual report which confirms its continuing financial ability to complete the Work. If, in a particular year, the annual report of any Participating Company does not confirm that Party's financial ability to complete the Work, that Party shall include with its annual report one or more of the following financial assurances: (A) a surety bond guaranteeing performance of the Work; (B) one or more irrevokable letters of credit equaling the total estimated cost of the Work; (C) a trust fund; or (D) a guarantee to perform the Work by one or more parent corporations or subsidiaries, or by one or more unrelated corporations that have a

substantial business relationship with at least one of the Settling Defendants. The above financial assurances may be revoked if a subsequent annual report of that Party confirms its financial ability to complete the Work. If, in a particular year, the annual report of SRP does not confirm SRP's financial ability to complete its respective Work, SRP shall consult with EPA and shall provide such other assurance as EPA deems necessary.

XVI. COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

A. Except as provided in Section XVI.B of this Amended Consent Decree, all activities undertaken by the Participating Companies, SRP, and the City pursuant to this Amended Consent Decree shall be undertaken in accordance with the requirements of all applicable federal and state laws and regulations, including Titles 45 and 49 of the Arizona Revised Statutes, and all ARARs. EPA, the State and the City have determined that the obligations and procedures set forth in this Amended Consent Decree comply with CERCLA and Arizona Revised Statutes Titles 45 and 49.

B. Pursuant to 42 U.S.C. § 9621(e), as interpreted by the NCP, no federal, State, or local permits are necessary for the Work that is performed entirely on the Site; provided however, if the State issues permits in a timely manner, the Participating Companies, SRP, and the City shall obtain and comply with State permits required under Title 45 of the Arizona Revised Statutes; and, provided further, if the City issues permits in a timely manner and waives permit fees, the Participating Companies and SRP shall obtain and comply with the City encroachment and building permits.

XVII. SUBMISSIONS OF DOCUMENTS, SAMPLING AND ANALYSIS

A. All Parties shall make available to all other Parties the results of sampling and/or tests or other data generated under this Amended Consent Decree by the Parties, or by individuals or entities acting on their behalf.

B. EPA reserves its right under Section 104(e) of CERCLA to observe the Work as it is performed. Each Party shall allow the other Parties, or their agents, to take split or replicate samples of any sample taken under this Amended Consent Decree.

1. The SAP developed pursuant to this Amended Consent Decree shall include the schedule for its implementation.

2. If any changes to, including additions to, any approved sampling schedule are necessary, the Participating Companies or SRP shall request approval from EPA

at least 7 days in advance of the rescheduled sampling event. EPA shall respond to such request in a timely manner. Nothing in this Section will preclude the Participating Companies, SRP or the City from taking additional samples, not required by this Amended Consent Decree, provided that such additional sampling will not interfere with any other obligations under this Amended Consent Decree.

3. In the event that unexpected conditions preclude notification pursuant to Section XVII.B.2 of this Amended Consent Decree, the Participating Companies or SRP shall orally notify the EPA Project Coordinator in advance of any changes to applicable sampling schedules. Within 72 hours after such notification, the Participating Companies or SRP shall submit to EPA a written description of the unexpected conditions it believes warranted the change and a description of the change.

4. Disposal of the residuals and samples generated by the Participating Companies or SRP or the City is the responsibility of the Participating Companies or SRP or the City as applicable, and disposal shall be in accordance with all applicable federal and state requirements.

C. Within 30 days of EPA's or the State's request, the Participating Companies and SRP agree to provide EPA or the State with existing technical data and technical information within that Party's possession or control that was generated after the Effective Date of this Amended Consent Decree relating to the Work, with the exception of any documents, records or information that are subject to a claim of attorney work product or attorney-client privilege and are identified as such and are determined to be entitled to the attorney work product or attorney-client privilege in accordance with procedures set forth in Section XVIII.A.2 of this Amended Consent Decree, including:

1. Final technical reports, letter reports, work plans, documents, records, files, memoranda, status reports, and written material developed using any source, including EPA, relating to the Work;

2. Final technical maps, computer generated graphics, charts, tables, data sheets, geologic cross-sections, lithologic logs, graphs, photographs, slides, or other such material developed relating to the Work; and

3. Computerized technical data and information relating to the Work, including creation, sorting, display and organization of a database.

D. All data, factual information, and documents submitted to or obtained by EPA or the State pursuant to this Amended Consent Decree shall be subject to public inspection at the respective EPA or State offices. The Parties explicitly recognize that the provisions of Section 104(e)(7)(F) of CERCLA apply to such data and information generated by the members of the Participating Companies and SRP. Members of the Participating Companies and SRP reserve their rights to assert a confidentiality claim for all other information pursuant to 18 U.S.C. § 1905 and 40 C.F.R. Part 2, and any applicable State laws and regulations. The provisions of this Section shall not constitute a waiver of any applicable claims of attorney work product or attorney-client or other legal privilege.

E. A plan and system to manage and organize data collected pursuant to this Amended Consent Decree shall be included as part of the RD/RA Work Plan.

F. Nothing in this Section shall limit EPA's or the State's rights under Section 104(e) of CERCLA, including its rights to inspect raw technical data that is in the possession of SRP or the Participating Companies and/or their subcontractors and that have been generated in connection with implementation of the Work.

XVIII. RETENTION OF RECORDS

A.

1. Each member of the Participating Companies, SRP, and the City shall preserve and retain all records and documents (in the form of originals or exact copies, or in the alternative, microfiche of all originals) currently in its possession or control that relate to groundwater or soil contamination or to remedial activity at the Site undertaken pursuant to this Amended Consent Decree or any previous administrative orders, regardless of any document retention policy to the contrary, for no less than either 10 years after the Effective Date of this Amended Consent Decree or 6 years after the creation of the document, in accordance with Section XVIII.B of this Amended Consent Decree, whichever is later. Until that date, each member of the Participating Companies, SRP, and the City shall preserve the records of its contractors, or its contractors' subcontractors and of anyone else acting on that Party's behalf at the Site, or shall instruct that such records be preserved. After the applicable period, each member of the Participating Companies, SRP, and the City shall notify EPA and the State in writing no later than 60 days prior to its proposed destruction of such documents.

Upon a request made by EPA or the State within 30 days of such notice, a member of the Participating Companies, SRP, or the City proposing to destroy such records shall make the following available to the EPA or the State:

a. originals, microfiche or best copy of any such records (with the exception of any documents, records or other information subject to a claim of attorney work product or attorney-client privilege); and

b. a list of any such documents, records or other information subject to a claim of attorney work product or attorney-client privilege which need not be provided to EPA or the State.

2. In the event EPA or the State disputes a claim of attorney work product or attorney-client privilege for any document(s), EPA may request submission of documentation supporting such claim of privilege by the Party making such claim. If after reviewing such documentation, EPA or the State continues to dispute the claim of privilege, EPA may petition the Court to review the applicability of the attorney work product and/or attorney-client privilege.

B. All documents that relate to compliance with this Amended Consent Decree created after the 10-year anniversary of the Effective Date of this Amended Consent Decree shall be retained for no less than 6 years after the creation of the document. At each succeeding 10-year anniversary, SRP and each member of the Participating Companies may destroy any documents retained for a minimum of 6 years after either providing 60 days prior written notice to EPA and the State of the intended destruction of such document in accordance with Section XVIII.A of this Amended Consent Decree, or providing EPA and the State with the original, microfiche or best copy of such documents in its possession if requested by EPA or the State within 30 days of receipt of notice from EPA or the State.

XIX. CLAIMS AGAINST THE FUND

A. In consideration of the entry of this Amended Consent Decree, the Participating Companies and SRP agree not to assert any claims directly or indirectly against the Hazardous Substance Superfund under any provisions of law, including, but not limited to, Sections 111 and 112 of CERCLA, 42 U.S.C. §§ 9611, 9612, and Section 106(b) (2), 42 U.S.C. § 9606(b) (2), concerning Work performed and costs incurred by the Participating Companies or SRP under this Amended Consent Decree, the 1991 Consent

Decree, or under previous administrative orders relating to the Site.

B. This Amended Consent Decree shall not be deemed to constitute a preauthorization of a CERCLA claim within the meaning of Sections 111 or 112 of CERCLA or 40 C.F.R. § 300.25(d).

C. In consideration of the entry of this Amended Consent Decree, the City agrees not to assert any claims directly or indirectly against the Hazardous Substance Superfund under any provisions of law, including, but not limited to, Sections 111 and 112 of CERCLA, 42 U.S.C. §§ 9611, 9612, and Section 106(b)(2),42 U.S.C. § 9606(b)(2), for Work performed by the City as required by this Amended Consent Decree, the 1991 Consent Decree, or expenditures made or costs incurred pursuant to the Amended Consent Decree or prior to the Effective Date of this Amended Consent Decree.

XX. TREATMENT CRITERIA

A. CGTF and MRTF

1. During routine operation of the CGTF and during all operations of the MRTF, all Treated Groundwater shall meet the standards applicable to municipal water supplies pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f-300j-11 (MCLs) for NIBW Contaminants of Concern, the cleanup levels identified in Table 3 of the Amended ROD, and the Performance Standards established in Section XII.B.7 of the Amended ROD[2]. The Participating Companies, EPA, the State, and the City acknowledge that the CGTF was designed to treat to drinking water standards influent water with a maximum concentration of 1500 ppb of trichloroethene and that the CGTF is capable of achieving the cleanup levels identified in Table 3 of the Amended ROD and the Performance Standards established in Section XII.B.7 of the Amended ROD. The Participating Companies, EPA, and the State acknowledge that the MRTF was designed to treat to drinking water standards influent water with a maximum concentration of 200 ppb of trichloroethene and that the MRTF is capable of achieving the cleanup levels identified in Table 3 of the Amended ROD and the Performance

[2] Chloroform produced as a by-product of municipal water supply disinfection is exempt from the treatment standard for chloroform identified in Table 3 of the Amended ROD. This does not exempt municipal suppliers from the requirements for chloroform under the federal Safe Drinking Water Act 42 U.S.C. §§ 300f to 300j.

Standards established in Section XII.B.7 of the Amended ROD.

2. In the event EPA or the State adopts new MCLs or numeric drinking water aquifer quality standards, respectively, for any of the VOCs identified in Table 3 of the Amended ROD that are more restrictive than the cleanup levels identified in Table 3 of the Amended ROD, any Party may petition EPA, with notice to other Parties, to apply the new standards as cleanup levels for such compound(s) and the procedures set forth in Section IX of this Amended Consent Decree shall apply.

3. The Participating Companies, SRP, the City and the State shall have judicial review of EPA's determination under Section XX.A.2 of this Amended Consent Decree if the NCP is amended to provide for such review. The United States does not believe that Section 113(h) of CERCLA, 42 U.S.C. § 9613(h), would have any relevance or application to a judicial proceeding to review EPA's determination pursuant to this Section. However, the Participating Companies, SRP, the City and the State reserve any rights they believe they may have under Section 113(h) with respect to such a proceeding.

B. Area 7

During operation of the Area 7 Plant, all Treated Groundwater shall meet MCLs for NIBW Contaminants of Concern and the Performance Standards established in Section XII.B.7 of the Amended ROD.

C. Area 12

During operation of the Area 12 Plant, all Treated Groundwater shall meet discharge limits in any NPDES Permit issued for the operation of the Area 12 Plant for NIBW Contaminants of Concern and the Performance Standards established in Section XII.B.7 of the Amended ROD.

D. Groundwater

1. Groundwater that is within the Zone of Ground Water Contamination shall be subject to extraction and treatment under this Amended Consent Decree. Extraction and treatment shall be required so long as monitoring data demonstrate that concentrations of those hazardous substances identified in Table 3 of the Amended ROD exceed the cleanup levels set forth in Table 3.

2. Groundwater extraction and treatment shall continue until the Performance Standard established in Section XII.B.8 of the Amended ROD has been met and

EPA has issued Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction). EPA may, in its discretion, allow for the termination of the operation of an NIBW groundwater treatment plant or a particular extraction well if it finds that such activity is no longer necessary to meet the requirements of this Amended Consent Decree.

E. Technical Impracticability

1. At the completion of a sustained period of operation of the remedy of not less than 20 years from the Effective Date, the Participating Companies may petition EPA to waive compliance with one or more of the MCLs set forth in Section XX.D of this Amended Consent Decree for the in-situ concentrations in groundwater based upon a demonstration that achievement of specific MCLs is technically impracticable from an engineering perspective.

2. EPA shall review and consider the information in the Petition, and any other relevant information, shall consult with the State and the City and shall make a determination as to:

   a. whether compliance with any of the MCLs for in-situ groundwater shall be waived;

   b. what alternative standards, if any, or other protective measures, if any, shall be established; and

   c. whether any part of the remedial action shall be modified or terminated in whole or in part.

   EPA's determination as to Technical Impracticability shall be consistent with the NCP and any other applicable regulations or guidance. The Participating Companies, SRP, the City and the State shall have judicial review of EPA's determination if the NCP is amended to provide for such review. The United States does not believe that Section 113(h) of CERCLA, 42 U.S.C. § 9613(h), would have any relevance or application to a judicial proceeding to review EPA's determination pursuant to this Section. However, the Participating Companies, SRP, the City and the State reserve any rights they believe they may have under Section 113(h) with respect to such a proceeding.

3. Any technical impracticability waiver that is granted pursuant to this Section shall be subject to the five-year review provision of Section 121(c) of CERCLA, 42 U.S.C. § 9621(c).

4. Nothing herein shall preclude or authorize any members of the Participating Companies or SRP from petitioning EPA to amend the Amended ROD based on any of the criteria specified in Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

F. Technology Change

After a period of one (1) year from the Effective Date of this Amended Consent Decree any of the Participating Companies may petition EPA, with notice to the City, to approve a change in any technology required to perform any of the Work. Any such petition shall be in writing and indicate:

1. the technology to be changed;
2. the new technology to be utilized;
3. the advantages of the new technology;
4. the facts establishing that the new technology shall accomplish, at least as effectively as the CGTF, the MRTF , the Area 7 Plant and the Area 12 Plant, the purposes of the Amended Consent Decree as stated in Section V, including providing potable water to the City to the extent provided by the Amended Consent Decree; and
5. any other relevant information deemed appropriate to approve or deny the petition.

EPA shall have 6 months from receipt of the petition either to approve, request additional information, or deny the petition. If additional information is requested, EPA shall have an additional sixty (60) days to review the additional information. Any change approved by EPA shall be set forth in a modification of this Amended Consent Decree. The Participating Companies shall have judicial review of EPA's determination if the NCP is amended to provide for such review. The United States does not believe that Section 113(h) of CERCLA, 42 U.S.C. § 9613(h), would have any relevance or application to a judicial proceeding to review EPA's determination pursuant to this Section. However, the Participating Companies reserve any rights they believe they may have under Section 113(h) with respect to such a proceeding.

XXI. OVERSIGHT COSTS

A. Annual Payments

1. Within 180 days of the end of each calendar year, EPA and the State shall use

their best efforts to submit to the Participating Companies an annual accounting of all Oversight Costs paid by EPA and the State, respectively, during the preceding calendar year.

a. EPA's annual accounting shall be compiled by EPA's Region IX office and consist of a summary of costs incurred and paid from the Superfund Cost Recovery Package and Imaging On-line System (SCORPIOS) or future system and a narrative summary for each month of the year similar to that attached as an example in Appendix G. EPA's accounting shall consist of a SCORPIOS Cost Summary or equivalent summary reflecting costs incurred and paid for the previous calendar year and a summary of any costs incurred and paid by the United States Department of Justice ("DOJ") during the previous calendar year; provided, however, that EPA reserves the right to withhold any documentation that is exempt from release under the Freedom of Information Act, 5 U.S.C. § 552.

b. The State's annual accounting shall consist of a compilation of Department of Administrative Financial Reports ("DAFRs") from the Unified Statewide Accounting System ("USAS") for the previous calendar year.

c. Failure to include all relevant Oversight Costs in any particular annual accounting shall not preclude EPA or the State from seeking such Oversight Costs in any subsequent annual accounting provided, however, that neither EPA nor the State shall seek Oversight Costs incurred more than six years prior to the date of submission of the annual accounting.

2. In the event that the Defense Contract Audit Agency ("DCAA") agrees to reimburse Motorola for payments made by Motorola under this Section XXI of this Amended Consent Decree and DCAA requires additional documentation of EPA's oversight costs, EPA will provide such documentation directly to DCAA.

3. Subject to Section XXI.A.4 of this Amended Consent Decree, the Participating Companies shall reimburse the federal Hazardous Substance Superfund and the State for Oversight Costs in the amount set forth in the annual accountings of EPA and the State within 90 days of the receipt of such accountings unless EPA or the State agrees to a period of time longer than 90 days.

a. As to EPA, checks for Oversight Costs payable to the Hazardous

Substance Superfund should reference the Site and Site SSID# and be addressed to:

U.S. Environmental Protection Agency -Region IX
ATTN: Superfund Accounting
P.O. Box 360863M
Pittsburgh, PA 15251
Attn: Collection Officer for Superfund

A copy of the transmittal letter and a copy of the check shall be sent to the EPA Project Coordinator.

b. As to the State, checks for Oversight Costs payable to the State Water Quality Assurance Revolving Fund should reference the Site and be addressed to:

Chief Financial Officer
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, Arizona 85007

A copy of the transmittal letter and a copy of the check shall be sent to the State Project Coordinator.

c. Payments made pursuant to this Section shall not constitute an admission by the Participating Companies of any liability for payments of Oversight Costs and shall not preclude them from seeking review of such costs as set forth in Section XXI.A.4 below.

4. Pursuant to Section XXI (Oversight Costs) and Section XXV (Dispute Resolution), the Participating Companies may dispute EPA's or the State's annual accounting. With respect to EPA's or the State's accounting, the Participating Companies may contest only that such accounting includes claims for costs not actually incurred or incurred in a manner inconsistent with the NCP. The Participating Companies shall raise any dispute of an annual accounting within one calendar year of EPA' s or the State's original request for payment of such

costs. In the event that it is determined that the Participating Companies overpaid Oversight Costs, any such amount overpaid shall be credited toward payment of Oversight Costs claimed by EPA or the State, respectively, in a subsequent accounting.

B. Final Payment

1. Within 360 days of EPA's issuance of a Certification of Completion of Remedial Action pursuant to Section XXXIX (Termination and Satisfaction), EPA and the State each shall use best efforts to provide the Participating Companies with a final demand for payment of all unreimbursed Oversight Costs incurred pursuant to this Amended Consent Decree. EPA's final accounting shall consist of the final SCORPIOS Cost Summary or equivalent summary. The State's final accounting shall consist of a final compilation of all DAFRs.

2. Within 90 days of receipt of EPA's or the State's final demand for payment, the Participating Companies either shall pay to the United States or the State all demanded costs, reduced by the amount of any credits due pursuant to Section XXI.A above, or pay all uncontested costs and invoke Dispute Resolution pursuant to Section XXI.A.4 above. If the Participating Companies invoke dispute resolution, the Participating Companies shall identify each cost contested and the basis for the objection. Within 30 days of invoking dispute resolution, the Participating Companies shall deposit an amount of money equal to the contested EPA costs and an amount of money equal to the contested State costs into separate interest-bearing escrow accounts designated for EPA and State disputed costs, respectively. If it is determined in dispute resolution that the Participating Companies are required to pay less than the full amount of EPA's or the State's final demand for payment, the difference between the amounts paid into the respective escrow accounts by the Participating Companies and the amounts determined to be owed by the Participating Companies in the dispute resolution shall be released to the Participating Companies, plus interest earned on the difference minus escrow account fees. The remaining balances in the escrow accounts shall be released to the United States and the State, respectively. If it is determined in dispute resolution that the Participating Companies are required to pay the full amount of EPA's or the State's final demanded payment, all money in the escrow accounts, including any interest accrued thereon, minus escrow

account fees paid by the Participating Companies, shall be released to the United States or the State.

XXII. PRIORITY OF CLAIMS

In any contribution action for cost of the Work or Response Actions performed under this Amended Consent Decree or the Consent Decree, the rights of any member of the Participating Companies, SRP, and the City shall be subordinate to the rights of the United States or the State, pursuant to Section 113(f)(3)(C) of CERCLA, 42 U.S.C. § 9613(f)(3)(C).

XXIII. STIPULATED PENALTIES

A. General Provisions

1. Stipulated penalties shall apply to noncompliance with the requirements of the 1991 Consent Decree prior to the Effective Date of this Amended Consent Decree and to noncompliance with the requirements of this Amended Consent Decree after the Effective Date of this Amended Consent Decree, unless the noncompliance is excused pursuant to the Force Majeure provisions of Section XXIV, or the Party responsible for enforcing the requirements waives or reduces any penalties associated with the alleged violation.

2. Stipulated penalties shall accrue as follows:

   a. for failure to perform any requirement of this Amended Consent Decree after the Effective Date, or the 1991 Consent Decree prior to the Effective Date, for which a deadline is specified, penalties shall begin to accrue on the first day after the deadline; and

   b. for any other violation of this Amended Consent Decree or the 1991 Consent Decree, penalties shall begin to accrue on the first day after the Party receives written notice from EPA of such violation.

3. Demands and Enforcement Actions

   a. Except as provided in Section XXIII.A.3.b of this Amended Consent Decree, demands and enforcement actions for stipulated penalties under

the 1991 Consent Decree and this Amended Consent Decree shall be undertaken exclusively by EPA.

b. In accordance with CERCLA Sections 121(e)(2) and 121(f), the State may demand, and take enforcement action before this Court to obtain, stipulated penalties under this Section if a Party's non-compliance giving rise to stipulated penalty liability violates the applicable requirements of Title 45 or 49 of the Arizona Revised Statutes or the substantive permitting requirements of Title 45 of the Arizona Revised Statutes; provided, however, that such enforcement action is subject to prior approval by EPA and notice to other Parties as described in Section XXV.C of this Amended Consent Decree; provided further that the State shall enforce Title 45, Chapter 2, Article 9 of the Arizona Revised Statutes as to the City pursuant to State laws and procedures.

c. In the event EPA takes enforcement action, all stipulated penalties collected shall be remitted to EPA pursuant to this Section. In the event the State takes an enforcement action under Section XXIII.A.3.b of this Amended Consent Decree, all penalties shall be remitted to the State pursuant to this Section.

d. In the event that EPA and the State jointly take an enforcement action all written communications from EPA and the State relating to such joint enforcement action shall be executed by both EPA and the State representatives. In the event such a joint enforcement action results in stipulated penalties, one-half of all penalties payable shall be remitted to the State and one-half shall be remitted to EPA pursuant to Section XXIII.A.4 of this Amended Consent Decree.

4. Payment Instructions

a. Stipulated penalties paid to EPA under this Section shall be paid by certified or cashier's check made payable to the Hazardous Substance Superfund and addressed to:

U.S. Environmental Protection Agency -Region IX
ATTN: Superfund Accounting
P.O. Box 360863M

Pittsburgh, PA 15251
Attn: Collection Officer for Superfund

The payment shall indicate that it is for stipulated penalties for the Site, indicate the Site identification number: SSID #0920, the DOJ case number 90-11-2-413/2 and name and address of the Party making the payment.

b. Stipulated penalties under this Section payable to the State for violations of Title 45 of the Arizona Revised Statutes shall be paid by certified or cashier's check made payable to Arizona Department of Water Resources and addressed to:

Legal Division
Arizona Department of Water Resources
500 N. Third Street
Phoenix, Arizona 85004-3903

c. Stipulated penalties under this Section payable to State for violations of Title 49 of the Arizona Revised Statutes shall be paid by certified or cashier's check made payable to Arizona Water Quality Assurance Revolving Fund and addressed to:

Chief Financial Officer
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, Arizona 85007

d. Except as provided in Section XXIII.D of this Amended Consent Decree, stipulated penalties shall be paid within 30 days of receipt of demand. Copies of the check and the letter forwarding the check, including a brief description of the triggering event, shall be submitted to EPA and the Department of Justice, or the State, where applicable, in accordance with Section XXVI (Form of Notice), herein.

5. SRP or the City, respectively, shall be liable for any stipulated penalties arising as a result of its acts or omissions incurred pursuant to Work conducted by or under the direction of SRP or the City. The Participating Companies are jointly and severally liable for stipulated penalties imposed pursuant to the provisions of this Section for any other acts or omissions under the 1991 Consent Decree or this Amended Consent Decree; provided, however, that the total amount due and payable for each day of each violation shall not exceed those limits specified in this Section.

B. Participating Companies and SRP

1. Progress Reports

a. If a Quarterly Report described in Section X.A.2.a of this Amended Consent Decree is not submitted in compliance with this Amended Consent Decree, the Participating Companies shall be subject to a stipulated penalty of $500 per day per violation.

b. If an NIBW Annual Site Monitoring Report described in Section X.A.2.c of this Amended Consent Decree is not submitted in compliance with this Amended Consent Decree, the Participating Companies shall be subject to a stipulated penalty of $1,000 per day per violation.

c. Until March of 2013, if groundwater data are not collected as described in Section VII.D.4 of this Amended Consent Decree and submitted to the Participating Companies as described in Section VII.D.6 of this Amended Consent Decree, SRP shall be subject to a stipulated penalty of $500 per day per violation.

2. All Other Requirements

a. If any requirement of the 1991 Consent Decree or this Amended Consent Decree, other than a reporting requirement described in Section XXIII.B.1 above, is not satisfied by compliance with the 1991 Consent Decree or this Amended Consent Decree, the Party responsible for satisfying such requirement shall be subject to stipulated penalties as governed by the applicable provision(s) of this Section. As used herein, compliance with the 1991 Consent Decree and this Amended Consent Decree includes compliance with any reports, plans, specifications (including discharge or emission limits), performance and submission

dates, and schedules, including appendices and attachments thereto, approved by EPA and incorporated into the 1991 Consent Decree and this Amended Consent Decree pursuant to Section X.B.

b. Stipulated penalties for completion of the groundwater monitoring obligations (including maintenance, operation and replacement of groundwater monitoring wells), other than those set forth in Section XXIII.B.1 above, shall be as follows:

Period of Failure to Comply	Penalty Per Violation Per Day
First through 14th calendar day	$ 5,000
Fifteenth through 30th calendar day	$ 7,500
Thirty-first calendar day and beyond	$ 20,000

c. Stipulated penalties for all other reports required by the Statement of Work, violations of Arizona Revised Statutes Titles 45 and 49 or for any other violation of the 1991 Consent Decree or this Amended Consent Decree, including noncompliance with Performance Standards, shall be as follows:

Period of Failure to Comply	Penalty Per Violation Per Day
First through 7th calendar day	$ 1,000
Eighth through 14th calendar day	$ 3,000
Fifteenth through 30th calendar day	$ 10,000
31st Day and Beyond	$ 15,000

C. City

1. Stipulated penalties in the amounts set forth in Section XXIII.B.2.c above shall be applicable to:

a. Noncompliance with CGTF operating procedures, CGTF compliance monitoring procedures, and CGTF response procedures as set forth in the CGTF O&M Plan.

b. Violations of Arizona Revised Statutes Titles 45 and 49, including the failure to put Treated Groundwater to beneficial use as required in Section VII.C.10 of this Amended Consent Decree, except as provided in

Section XXIII.A.3.b of this Amended Consent Decree.

2. If a Compliance Monitoring Report described in Section VII.C.9 of this Amended Consent Decree is not submitted in compliance with this Amended Consent Decree, the City shall be subject to a stipulated penalty of $500 per day per violation.

3. Stipulated penalties for exceeding the groundwater cleanup standards set forth in Table 3 of the Amended ROD at the CGTF common sump as described in the CGTF O&M Plan and non-compliance with the Performance Standard set forth in Section XII.B.2.b of the Amended ROD as described in the O&M Plan shall be in the following amounts:

Period of Failure to Comply	Penalty Per Violation Per Day
First 7 operational days after 1st results showing exceedance	$ 500
8th operational day after 1st results showing exceedance and beyond	$1,000

4. Except as provided in Sections XXIII.C.1, XXIII.C.2 and XXIII.C.3 of this Amended Consent Decree, no stipulated penalties shall be applicable to requirements for which the City is responsible under this Amended Consent Decree. EPA reserves the right to assess civil penalties against the City in accordance with Section 109 of CERCLA only for requirements for which stipulated penalties are not provided in Sections XXIII.C.1 , XXIII.C.2 and XXIII.C.3 of this Amended Consent Decree.

5. The stipulated penalties in Section XXIII.C.3 of this Amended Consent Decree shall be the exclusive mechanism for the assessment and collection of penalties from the City for exceeding the groundwater cleanup standards set forth in Table 3 of the Amended ROD at the CGTF unless EPA elects in lieu of demanding such stipulated penalties, to seek civil penalties under the Safe Drinking Water Act.

D. The Parties may dispute EPA's or the State's right to the stipulated penalties demanded pursuant to this Section in accordance with the dispute resolution procedures of Section

XXV of this Amended Consent Decree. Penalties need not be paid during the dispute resolution period. If the Court does not adopt the enforcing Party's Final Statement of Position, no penalties shall be due. If the enforcing Party's Final Statement of Position is adopted by the Court, such Party shall have the right to collect all penalties that accrued during the dispute.

E. Except as provided in Section VI.C of this Amended Consent Decree, the stipulated penalties established in this Amended Consent Decree shall be the exclusive mechanism for the assessment and collection of penalties for noncompliance with the provisions subject to stipulated penalties, unless EPA elects, in lieu of demanding such stipulated penalties, to seek civil penalties under CERCLA.

XXIV. FORCE MAJEURE

A. The Participating Companies, SRP, and the City shall perform all the requirements of this Amended Consent Decree according to the time limits set out in the Amended Consent Decree and referenced supporting documents or any modification thereto unless their performance is prevented or delayed by events that constitute a force majeure event.

B. For purposes of this Amended Consent Decree, force majeure is defined as any event arising from causes beyond the control of the Party required to perform an obligation under this Amended Consent Decree, or its contractors, subcontractors or consultants, which delays or prevents the performance of such obligation and could not have been overcome or prevented by such Party's efforts. Such Party shall have the burden of proving that an event constituted force majeure for the purpose of this Amended Consent Decree. When circumstances are occurring or have occurred that delay or may delay the completion of any phase of the Work, whether or not due to a force majeure event, the Party obligated to perform the Work shall notify EPA's Project Coordinator orally within 48 hours and, within 7 days of oral notification to EPA, shall notify the EPA Project Coordinator in writing of the anticipated length and cause of the delay; which of the tasks are directly affected by the delay; the measures taken and/or to be taken to prevent or minimize the delay; the timetable by which the Party intends to implement these measures; and, as appropriate, all information supporting its position that the event constitutes force majeure.

C. Force majeure shall not include increased costs or expenses of any of the Work to be performed under the Amended Consent Decree or the financial inability of the

Participating Companies or SRP, to perform such Work, or the failure of Participating Companies, SRP, or the City to make timely application for any required permits or approvals, and to provide all information required therefor in a timely manner. Force majeure shall also not include the failure of a contractor to perform its obligations under a contract.

D. Following receipt of the written notice described in Section XXIV.B of this Amended Consent Decree, EPA shall advise the Party providing the notice whether it deems the event to constitute force majeure, and if so, it also shall advise the Party of the appropriate modification to the schedules for the Work to be performed. No deadline shall be extended beyond that period of time which is necessary to complete the activities. The Participating Companies, SRP, and the City shall adopt measures to avoid or minimize delay.

E. Failure of the Participating Companies, SRP, or the City to comply with the notice requirements of this Section shall constitute a waiver of any claim that the event constitutes force majeure under this Amended Consent Decree unless such notice is prevented by a force majeure event.

F. If EPA and the Participating Companies, SRP, or the City do not agree as to whether an event constitutes force majeure or what schedule modification is appropriate, the dispute shall be resolved by the procedures outlined in Section XXV (Dispute Resolution) of this Amended Consent Decree. If it is determined by agreement of the Parties or by the procedures outlined in Section XXV of this Amended Consent Decree that an event does not constitute force majeure, delays in meeting deadlines for Work arising from such event shall be subject to the provisions of Section XXIII (Stipulated Penalties).

XXV. DISPUTE RESOLUTION

A. Initial Dispute Resolution Procedure

1. The Parties to this Amended Consent Decree shall attempt to resolve expeditiously and informally any disagreements concerning implementation of this Amended Consent Decree or any Work required herein. If the disagreement cannot be resolved promptly, then SRP, any member of the Participating Companies, or the City may file a notice of dispute with EPA; provided, however, that disputes involving an alleged violation of Arizona Revised Statutes Titles 45 and 49 and applicable rules shall also be filed with the State. Such

period of informal negotiations shall extend for ten (10) working days following receipt of such notice by EPA or the State, unless EPA or the State determines that a longer period is reasonably appropriate. During the informal negotiation period, the Parties may also agree to utilize appropriate Alternative Dispute Resolution ("ADR") mechanisms. After the expiration of the informal negotiation period if there is no agreement, the Party deemed responsible pursuant to Section XXV.C of this Amended Consent Decree for enforcing the requirement that is subject to dispute shall issue a written Final Statement of Position on the matter in dispute.

2. An administrative record of any dispute shall be maintained by EPA provided, however, that if, pursuant to Section XXV.C of this Amended Consent Decree, the State has exclusive enforcement authority regarding such dispute, the State shall maintain the administrative record. The record shall include the written notification of such dispute, any relevant documents generated by any of the Parties or their contractors or agents, any other relevant documents submitted by any of the Parties and any other materials relied upon by the decision maker(s). To ensure that the administrative record is complete, the Parties shall, within five (5) working days of the beginning of the informal negotiation period, confer to discuss the documents proposed for inclusion in the administrative record.

3. In the event that a petition relating to the dispute is not filed pursuant to Section XXV.B of this Amended Consent Decree, the dispute shall be deemed resolved in accordance with the Final Statement of Position issued pursuant to Section XXV.A of this Amended Consent Decree and such position shall be deemed effective 3 days following the receipt by the Party that filed the notice of dispute of such Final Statement of Position provided, however, such effective date may be extended by the Party issuing the Final Statement of Position for good cause shown.

B. Judicial Resolution

1. In the event that any Party seeks judicial resolution of the dispute, it shall file within 21 days of the effective date of the Final Statement of Position described in Section XXV.A a petition with the Court which shall describe the nature of the dispute and include a proposal for its resolution. All other Parties shall have 30 days to respond to the petition.

2. In all disputes involving EPA or the State, the petitioning Party shall have the burden of proof. Any Final Statement of Position reflecting a decision by EPA on selection, extent or adequacy of the response action will be reviewed by the Court on the basis of the administrative record and will be upheld by the Court unless it is arbitrary and capricious or otherwise not in accordance with the law. Any decision by the Court under this Section is subject to appeal.

3. Except as specified in Sections XXV.A.2 and XXV.B.2 above or otherwise in this Amended Consent Decree, this Decree does not establish the scope of information and materials which may be considered by the Court or standards of any kind for judicial determination of disputes between the Parties.

4. Notwithstanding the provisions in Section XXV.B.2 above, if Congress establishes or provides for a different procedure or standard of review, any Party may move the Court to modify Section XXV .B. 2 to conform to such procedure or standard.

C. Disputes Between EPA and the State

1. The State shall notify EPA of its intent to enforce noncompliance with this Amended Consent Decree involving violations of Titles 45 and 49 of the Arizona Revised Statutes. If EPA approves such action, it shall notify all Parties in writing. If EPA fails to approve such action within 10 working days, the State and EPA shall be considered in informal dispute. In addition, if EPA and the State disagree concerning the State's proposed disposition of any such action, the State and EPA shall be considered in informal dispute. The State and EPA shall attempt to resolve any disagreement expeditiously and informally. At the expiration of an informal negotiation period not to exceed 30 days, EPA shall issue a written Statement of Position.

2. If the State disagrees with EPA's Statement of Position, it shall submit a notice of dispute to EPA within 20 days of issuance of EPA's Statement of Position. The notice of dispute shall be accompanied by a written statement of the issues in dispute, the relevant facts upon which the dispute is based, the factual data, analysis or opinion supporting the State's position and all supporting documentation on which the State relies (hereinafter the "State's Supporting Statement"). The EPA shall serve EPA's Supporting Statement to the State no

later than 20 working days after receipt of the State's Supporting Statement.

3. An administrative record of any dispute under this Section shall be maintained by EPA. The record shall include the notice of dispute and the Supporting Statement of both parties, and any other material relied upon by the decision maker(s). The record shall be available for inspection by all Parties.

4. The Division Director for Superfund, EPA Region IX, and the Director of the Arizona Department of Environmental Quality (in the case of a Title 49 dispute) or the Director of the Department of Water Resources (in the case of a Title 45 dispute) shall review the administrative record of the dispute, shall confer with each other concerning the dispute, and shall attempt to reach a joint decision resolving the dispute. If a joint decision is reached, the decision shall be documented by a joint Final Statement of Position, which shall be served on all Parties.

5. If no joint decision is reached under Section XXV.C of this Amended Consent Decree, the Division Director for Superfund, U.S. EPA Region IX, shall issue a "Final Statement of Position" within forty (40) days from receipt of the notice of dispute, which shall be served on all Parties.

6. In the event the State seeks judicial resolution of the dispute, it shall file a petition with the Court within ten (10) days of receipt of the Final Statement of Position. Judicial review shall be limited to the administrative record and shall be in accordance with the standard of review applicable under CERCLA and any other applicable law. Unless reversed or remanded by the Court, EPA's Final Statement of Position shall be controlling as between EPA and the State.

7. In the event of a dispute between EPA and the State regarding the manner of compliance with this Amended Consent Decree, the dispute shall be resolved as expeditiously as possible. The Participating Companies and SRP shall cooperate and assist as appropriate in the resolution of the dispute. If the dispute between EPA and the State relates to the manner of performance of the Work, the Participating Companies or SRP shall, if EPA deems such suspension to be necessary, suspend performance of the affected portion of the Work until the dispute is resolved. If EPA does not deem such suspension to be necessary, the provisions of Sections XXV.A and XXV.B (Dispute Resolution) shall apply. Any delay in performance of the Work caused by or attributable to a dispute

between EPA and the State shall constitute force majeure.

XXVI. FORM OF NOTICE

A. When notification to or communication with EPA, the DOJ, the Participating Companies, SRP, the City or the State is required by the terms of this Amended Consent Decree, it shall be in writing, postage prepaid, and addressed as follows:

As to EPA:
EPA Project Coordinator
Indian Bend Wash North Site
Federal Facilities & Site Cleanup Branch (SFD-8-2)
U.S. Environmental Protection Agency 75 Hawthorne Street
San Francisco, CA 94105

As to DOJ :
Chief Environmental Enforcement Section
Environment & Natural Resources Division U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611
DOJ 90-11-2-413/2

As to the Participating Companies:
Donald Netko
Motorola, Inc.
3102 N. 56th Street (mail stop 56-128)
Phoenix, Arizona 85018

As to SRP:
Manager, Environmental Services Department
P.O. Box 52025
Salt River Project
Phoenix, Arizona 85072-2025

As to the State:
North Indian Bend Wash Superfund Site, ADEQ Project Manager
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

North Indian Bend Wash Superfund Site, ADWR Project Manager
Arizona Department of Water Resources
500 North Third Street
Phoenix, Arizona 85004

As to the City:
North Indian Bend Wash Project Coordinator
Water Operations, City of Scottsdale
9312 N. 94th Street
Scottsdale, Arizona 85258

B. Any submission to EPA for approval pursuant to this Amended Consent Decree shall be made to the address shown above and shall be made by overnight mail or any other equivalent delivery service.

C. Any Party may change the recipient of notice pursuant to this section by providing written notice to all Parties.

XXVII. MODIFICATION

A. The Parties recognize that information or data gathered or events which occur during the performance of the Work required by this Amended Consent Decree may indicate that modifications to the Work schedule are necessary to accomplish the purpose of Section V and/or Section VII of the Amended Consent Decree. In that event, except as provided in Section XXVII.B below, the Participating Companies, SRP, or the City may propose, in writing, extensions to the schedule for the Work's performance. Such proposed extensions shall not be implemented prior to the written approval by EPA. If EPA denies

a request for extensions, the denial shall be subject to the dispute resolution process of Section XXV. Any extensions ultimately implemented shall be memorialized in writing by EPA, made available to the Participating Companies, SRP, or the City, and constitute a modification of this Amended Consent Decree.

B. Where a modification to the Work or extension of the Work schedule is proposed as a result of an unanticipated condition in the field or laboratory, and time is of the essence, the modification or extension may be orally proposed to, and approved by, either EPA's on-scene representative, or in his (her) absence, the EPA Project Coordinator. Any such approved modification or extension shall be memorialized in writing and transmitted to EPA within 72 hours by the City, SRP, or the Participating Companies.

C. Modifications related to the performance of Work shall be made in accordance with Section IX (Additional Site Work).

D. Except as provided in this Amended Consent Decree, there shall be no modification of this Amended Consent Decree without written approval of all Parties to this Amended Consent Decree.

E. Any Party may file with the Court a written modification approved under this Section.

F. No material modifications shall be made to the Statement of Work without written notification to and written approval of the United States, the Participating Companies, SRP, the City, and the Court, if such modifications fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R. § 300.435(c)(2)(B)(ii). Prior to providing its approval to any modification, the United States will provide the State with a reasonable opportunity to review and comment on the proposed modification. Modifications to the Statement of Work that do not materially alter that document, or material modifications to the Statement of Work that do not fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R. § 300.435(c)(2)(B)(ii), may be made by written agreement between EPA and the Participating Companies, after providing the State with a reasonable opportunity to review and comment on the proposed modification. The written agreement must also be agreed to by SRP if SRP's rights or obligations would be modified by the agreement, and by the City if the City's rights or obligations would be modified by the agreement.

XXVIII. ADMISSIBILITY OF DATA

For the purposes of enforcement of this Amended Consent Decree only, the Parties waive any

evidentiary objection to the admissibility of data gathered or generated by any Party in the performance or oversight of the Work under this Amended Consent Decree that has been verified using the Quality Assurance and Quality Control procedures specified in Section XII of this Amended Consent Decree.

XXIX. EFFECTIVE DATE

This Amended Consent Decree is effective upon the date of its entry by the Court.

XXX. CONTRIBUTION PROTECTION

By entering into this Amended Consent Decree, the Participating Companies, SRP, and the City (to the extent any such Party has any liability to the United States) have resolved their liability to the United States for Covered Matters, as defined in Section XXXI.B of this Amended Consent Decree. Accordingly, pursuant to Section 113(f)(2) of CERCLA and other applicable federal and State law, no member of the Participating Companies, SRP, or the City shall be liable to other persons or entities for contribution claims regarding Covered Matters as defined in Section XXXI.B of this Amended Consent Decree. Nothing in this Section shall be construed to provide contribution protection to any person not a Party to this Amended Consent Decree. Each Party expressly reserves its right to bring any appropriate action against persons and entities which are not Parties hereto to recover response costs incurred by it.

XXXI. COVENANTS NOT TO SUE AND RESERVATION OF RIGHTS

A. In consideration of actions which will be performed and payments which will be made by the Participating Companies, SRP, and the City under the terms of the Amended Consent Decree, and except as otherwise specifically provided in this Section, the United States, the State, and the City covenant not to sue any member of the Participating Companies, SRP, or their officers, directors, governing bodies, or any member thereof, employees, or agents, and the United States and the State covenant not to sue the City for Covered Matters.

B.

1. Except as provided in Section XXXI.C below, Covered Matters shall include any and all claims under the statutory provisions set forth in Section XXXI.B.2, or any State public health or State environmental common law doctrine relating to groundwater contamination in the UAU (with respect to matters addressed in

this Amended Consent Decree only), MAU, and LAU at the Site and activities performed by any Party in compliance with the 1991 Consent Decree or this Amended Consent Decree.

2. The statutory provisions described in Section XXXI.B.1 are as follows:

   a. Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607; Section 7003 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6973; Section 1431 of the Safe Drinking Water Act, 42 U.S.C. § 300i.

   b. Arizona Revised Statutes Titles 45 and 49 except, with respect to the City, Chapter 2, Article 9 of Title 45.

   c. Any City ordinance applicable to the releases of hazardous substances into the groundwater that are the subject of this Amended Consent Decree.

3. Covered matters shall also include claims against the City under Sections 106 and 107 of CERCLA, 42 USC § 9606 and 9607, Arizona Revised Statutes Title 49, Chapter 2, Article 5, and Title 49, Chapter 6, and Section 7003 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6973; Section 1431 of the Safe Drinking Water Act, 42 U.S.C. § 300i, relating to groundwater or soil contamination on or emanating from the parcel acquired pursuant to Section VII.B.3.a existing prior to transfer of title to the City.

C. "Covered Matters" do not include:

1. Actions before this Court to enforce compliance with the 1991 Consent Decree (for noncompliance occuring prior to the Effective Date) and the Amended Consent Decree (for noncompliance occurring after the Effective Date).

2.

   a. Claims under CERCLA or the State Water Quality Assurance Revolving Fund for any response costs incurred prior to the effective date of the 1991 Consent Decree by the United States and the State, except for costs reimbursed pursuant to Section XL of the 1991 Consent Decree.

   b. Claims under CERCLA or the State Water Quality Assurance Revolving Fund for response costs incurred subsequent to the Effective Date of this Amended Consent Decree by the United States, the State, and the City except for the following costs, which are Covered Matters:

(1) Response Costs described in Section VI.C (Takeover of Work) and Oversight Costs as described in Section XXI of this Amended Consent Decree; and

(2) Costs incurred by the City for which the City is expressly responsible under the 1991 Consent Decree and this Amended Consent Decree.

3. Claims based on the past, present, or future disposal of hazardous substances at any locations outside of the Site.

4. Claims based on criminal liability, including criminal claims brought under Arizona Revised Statutes Title 49.

5. Claims based on liability for damage to natural resources as defined in CERCLA.

6. Claims based on liability for any violations of federal or state statutes or City ordinance that occur during implementation of the Work.

7. Claims for remedial action with respect to either soil or groundwater in the UAU at the Site to the extent that these claims are not addressed in the 1993 Consent Decree or this Amended Consent Decree.

8. Any matters for which the United States is owed indemnification under Section XXXII hereof.

9. Claims for damage to federal, State or City property.

10. Claims for hazardous substances removed from the Site.

11. Claims for Response Costs incurred or remedial actions necessary pursuant to the five-year review in accordance with Section 121(c) of CERCLA.

12. Claims arising from any injuries or damages to persons or property resulting from any Party's acts or omissions or the acts or omissions of its officers, directors, governing bodies, or any member thereof, employees, agents, receivers, trustees, successors, assigns, contractors, subcontractors, or any other person acting on its behalf in carrying out the Party's obligations under the 1991 Consent Decree and this Amended Consent Decree, except as otherwise provided in Section XXXII.

13. Claims related to petroleum underground storage tanks brought under Chapter 6 of Arizona Revised Statutes Title 49.

D. Notwithstanding any other provision in this Section, the covenant not to sue described in

Section XXXI.A does not include the initiation of proceedings in this action or in a new action: (a) for issuance of an order seeking to compel the Participating Companies, SRP, or the City to perform CERCLA response actions in addition to Work required by this Amended Consent Decree or to reimburse EPA and the State for costs of response; or (b) for appropriate actions under Section 300i of the Safe Drinking Water Act, where liability arises under the following conditions:

1. For proceedings prior to certification pursuant to Section XXXIX below, (a) conditions at the Site, previously unknown to the United States are discovered after the Effective Date of this Amended Consent Decree, or (b) information is received, in whole or in part, after the Effective Date of this Amended Consent Decree, and those previously unknown conditions or that information indicate(s) that the remedial action is not protective of human health and the environment; and

2. For proceedings subsequent to certification pursuant to Section XXXIX below, (a) conditions at the Site previously unknown to the United States are discovered after the certification of completion by EPA, or (b) information is received, in whole or in part, after certification of completion by EPA; and those previously unknown condition(s) or that information indicate(s) that the remedial action is not protective of human health and the environment.

E.

1. In addition, each member of the Participating Companies, SRP, and the City covenant not to sue any other member of the Participating Companies, SRP, or the City for:

   a. Covered Matters, including performance of the Work and any obligation to pay for the Work, except as to (1) any agreements among them relating to performance under this Amended Consent Decree and (2) the extent that the Participating Companies are in substantive default of their obligations to make payments under Section VII.B.5.d of this Amended Consent Decree.

   b. Claims for contribution under Section 113 of CERCLA, 42 U.S.C. § 9613, relating to:

      (1) groundwater contamination in the UAU, MAU and LAU at the Site;

(2) activities performed by any Party in compliance with this Amended Consent Decree; or

(3) claims relating to groundwater or soil contamination on or emanating from the parcel acquired pursuant to Section VII.F.1 of the 1991 Consent Decree existing prior to transfer of title to the City.

2. Nothing in Section XXXI.E.1 of this Amended Consent Decree shall be construed to preclude SRP, any member of the Participating Companies or the City from bringing the actions or claims described in Section XXXI.C of this Amended Consent Decree.

3. Notwithstanding any other provision of this Amended Consent Decree, the City shall have the right to enforce independently the Participating Companies' obligations to pay to the City the costs of operation and maintenance of the CGTF and to pay the costs of design of the CGTF in excess of the City's obligation to pay such costs. In any such enforcement action, Arizona law shall govern and the prevailing Party shall be entitled to receive from the other Party reasonable attorneys' fees and reasonable costs and expenses, determined by the court sitting without a jury, which shall be deemed to have accrued on the commencement of such action.

F. Except for future liability, the covenants not to sue set forth in this Section shall take effect on the Effective Date of this Amended Consent Decree and shall be effective during the performance of the Work as to any Party that is in full compliance with its obligations under this Amended Consent Decree. With respect to future liability for Covered Matters, the covenants not to sue shall take effect upon EPA's issuance of Certification of Completion of Remedial Action as set forth in Section XXXIX. All covenants not to sue shall remain in effect following termination of this Amended Consent Decree.

G. Nothing in this Amended Consent Decree shall constitute or be construed as a release or covenant not to sue regarding any claim or cause of action against any person as defined in Section 101(21) of CERCLA, or other entity, not a Party to this Amended Consent Decree for any liability it may have arising out of or relating to the Site.

H. The Parties hereto agree that the United States and the State shall be under no obligation to assist any Party in any way in defending against suits for contribution which allege

liability for matters covered by this covenant not to sue by persons or entities that have not signed the 1991 Consent Decree and this Amended Consent Decree, except that the United States shall certify that any Work performed in compliance with this Amended Consent Decree is consistent with the NCP.

I. This Amended Consent Decree supersedes all previous Administrative Orders issued by EPA to SRP or any member of the Participating Companies prior to the effective date of the 1991 Consent Decree, pursuant to CERCLA Section 106, or the Resource Conservation and Recovery Act Section 3013, 42 U.S.C. § 6934, regarding remedial action and remedial investigation at the Site with the exception of the following provisions of previous administrative orders, which shall survive and remain in effect: Section XXV of Order No.84-01; Section XXVIII of Order No.86-06; Sections XV and XVI of Order No.87-05; Section XVI and the fourth and fifth paragraphs of Section XV of Order No.89-02; subject to Section XIX of this Amended Consent Decree, paragraph No.6 of Section III of Order No.84-04; and Section XVI and the fourth and fifth paragraphs of Section XV of Order No.89-12. Except as to uncollected Oversight Costs, the provisions of Order No.89-15 as amended and docketed as Amended Order No.90-05, are hereby withdrawn and of no legal effect as to the members of the Participating Companies and SRP. In addition, except as to uncollected Oversight Costs, EPA hereby determines that the Participating Companies and SRP have satisfied all of their respective obligations under Order Nos. 84-12, 87-05,86-06,84-01, and 89-02 and 84-04, and that the Work performed pursuant to such Orders is consistent with the NCP.

J. The Parties recognize that the Participating Companies and SRP are entering into this Amended Consent Decree as a compromise of disputed claims and the Participating Companies and SRP do not admit, accept, or intend to acknowledge any liability or fault with respect to any matter arising out of or related to the Site. The Participating Companies and SRP do not admit to any allegation made in the Complaint, except as provided in Section II of this Amended Consent Decree. The Participating Companies and SRP expressly reserve all rights and defenses that they may have with respect to any factual or legal claims or determinations made herein by EPA, except the Participating Companies and SRP do not contest the entry of this Amended Consent Decree and agrees to be bound by its terms.

K. Except as provided in this Amended Consent Decree, this Amended Consent Decree shall not be deemed to limit the authority of EPA to perform response actions under Sections

104 or 106 of CERCLA, 42 U.S.C. §§ 9604, 9606, or under any other federal response authority.

L. The United States expressly reserves all rights and defenses that it may have, including the right both to disapprove submissions pursuant to Section X and to require Additional Site Work pursuant to Section IX.

XXXII. INDEMNIFICATION

A. Each member of the Participating Companies shall indemnify and hold the United States and the State harmless for any claims arising from any injuries or damages to persons or property resulting from any of each member's acts or omissions, or the acts or omissions of its officers, directors, governing bodies, or any member thereof, employees, agents, receivers, trustees, successors, assigns, contractors, subcontractors, or any other person acting on its behalf in carrying out its obligations under the 1991 Consent Decree and this Amended Consent Decree. In the event of any suit alleging such injuries or damages, the United States or the State will defend in good faith against such suit to the extent consistent with the applicable law; provided, however, that there shall be no judicial review of any efforts made by the United States or the State to defend against such suit.

B. SRP shall indemnify and hold the United States and the State harmless for any claims arising from any injuries or damages to persons or property resulting from any of SRP's acts or omissions, or the acts or omissions of its officers, directors, governing bodies, or any member thereof, employees, agents, receivers, trustees, successors, assigns, contractors, subcontractors, or any other person acting on its behalf in carrying out its obligations under the 1991 Consent Decree and this Amended Consent Decree. In the event of any suit alleging such injuries or damages, the United States or the State will defend in good faith against such suit to the extent consistent with the applicable law; provided however, that there shall be no judicial review of any efforts made by the United States or the State to defend against such suit.

C. A Party indemnified under Section XXXII.A. or B. shall provide notice to the applicable indemnitor of any such suit within 45 days of its service upon such Party. Rights to intervene in any such suit shall be governed by the Federal Rules of Civil Procedure. A Party indemnified under Section XXXII.A. or B. shall provide the applicable indemnitor an opportunity to confer with it before settling any such suit.

D. The Participating Companies agree to indemnify, defend and hold the City harmless for

claims arising from discharges into McKellips Lake of water from the CGTF with levels of contamination above the levels identified in Section XX of this Amended Consent Decree; provided, however, that the Participating Companies will not indemnify the City for any claims arising from discharges resulting from the City's negligent operation of the CGTF or failure to comply with the applicable terms of the Plant Operations and Maintenance Plan. The City shall provide notice to the Participating Companies of any such claim within ten (10) days of receipt of a notice of claim filed by the plaintiff pursuant to Arizona Revised Statutes § 12-821 or service of a complaint upon the City. Within thirty (30) days of the date of the City's notice to the Participating Companies, the Participating Companies shall inform the City of whether they intend to defend the claim on behalf of the City or do not intend to defend against the claim because they have a good faith belief that the discharge resulted from the City's negligent operation of the CGTF or a failure of the City to comply with the applicable terms of the Operations and Maintenance Plan. If the Participating Companies agree to defend against such claims, they shall have sole control over the defense, including any decision whether to settle, compromise or litigate any claim covered by this indemnity. Nothing shall prohibit the City from taking any actions to protect the City's legal interest prior to notice from the Participating Companies that they intend to defend against the claim. The City will cooperate fully with the Companies' defense of any such claims and will make its employees available under reasonable terms and conditions without cost to the Companies.

XXXIII. WAIVER OF CLAIM SPLITTING DEFENSE

In any subsequent administrative or judicial proceeding initiated by the United States or the State for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, the members of the Participating Companies and SRP and the City hereby waive the defenses of res judicata, collateral estoppel, claim-splitting, issue preclusion, and claim preclusion, with respect to (i) the Plaintiffs' right to pursue subsequent claims under the statutes described under Section XXXI.B of this Amended Consent Decree regarding responsibility for any remedial action which may be necessary; or (ii) Response Costs incurred at the Site that are not a Covered Matter under Section XXXI of this Amended Consent Decree.

XXXIV. COMMUNITY RELATIONS

The Parties shall cooperate with EPA in providing information to the public. As requested by EPA, the members of the Participating Companies and SRP shall participate in the preparation of all appropriate information disseminated to the public and in public meeting(s) which may be held or sponsored by EPA to explain activities at or concerning the Site.

XXXV. LODGING AND PUBLIC PARTICIPATION

Pursuant to Section 122(d) of CERCLA, 42 U.S.C. § 9622(d), and 28 C.F.R. § 50.7, this Amended Consent Decree will be lodged with the Court for 30 days, and the United States shall publish a Notice of Availability of review to allow public comment prior to entry by the Court. The United States will file with the Court a copy of any comments received and the responses of the United States to such comments.

XXXVI. OTHER CLAIMS

With respect to any person, firm, partnership, corporation, or other entity not a Party to this Amended Consent Decree, nothing in this Amended Consent Decree shall constitute or be construed as a covenant not to sue by any Party with respect to, nor as a release from, any claims, causes of action, or demands in law or equity.

XXXVII. CONTINUING JURISDICTION

The Court specifically retains jurisdiction over both the subject matter of and the Parties to this action for the duration of this Amended Consent Decree for the purposes of issuing such further orders or directions as may be necessary or appropriate to construe, implement, modify, enforce, terminate, or reinstate the terms of this Amended Consent Decree or for any further relief as the interest of justice may require.

XXXVIII. REPRESENTATIVE AUTHORITY

Each undersigned representative of each Party to this Amended Consent Decree certifies that he or she is fully authorized by the Party to enter into and execute the terms and conditions of this Amended Consent Decree, and to legally bind such Party to this Amended Consent Decree.

XXXIX. TERMINATION AND SATISFACTION

A. Certification of Completion of Remedial Action

1. When the Participating Companies are able to demonstrate that the groundwater

in the UAU, MAU and LAU meets the Performance Standards set forth in Section XII.B.8 of the Amended ROD or if the Participating Companies determine that Section XX.C (Technical Impracticability) applies, they shall submit to EPA and the State, with notice to the City, a Certification of Completion of Remedial Action Report and supporting documentation, which summarizes the Work done and the remediation goals achieved.

2. Upon receipt of the Certification of Completion of Remedial Action Report, EPA shall review the Report, any supporting documentation, and the remedial actions taken. EPA shall issue a Certification of Completion of Remedial Action to the Participating Companies, with notice to the City, upon a determination that the Participating Companies have demonstrated compliance with the requirements of this Amended Consent Decree to EPA's satisfaction at the time EPA reviews the Certification of Completion of Remedial Action Report. If EPA fails to issue the requested Certification within 120 days, the dispute resolution procedures in Section XXV shall apply.

3. Upon the filing of EPA's Certification of Completion of Remedial Action pursuant to the preceding Section, and a showing that the other terms of this Amended Consent Decree have been complied with, this Amended Consent Decree may be terminated upon motion of the United States.

B. In the event that Additional Site Work is undertaken to remediate the UAU, MAU and LAU in accordance with the procedures set forth in Section IX (Additional Site Work), and that such Additional Site Work supersedes all or part of the Work required by Section VII of this Amended Consent Decree, the superseded obligations of Section VII of this Amended Consent Decree shall be deemed satisfied, and the Participating Companies and SRP shall terminate such superseded Work.

C. Termination of this Amended Consent Decree shall not alter the provisions of Section XIX (Claims Against the Fund), Section XXX (Contribution Protection) and Section XXXI (Covenants Not to Sue and Reservation of Rights).

XL. SECTION HEADINGS

The section headings set forth in this Amended Consent Decree and its Table of Contents are included for convenience of reference only and shall be disregarded in the construction and interpretation of any of the provisions of this Amended Consent Decree.

XLI. EXECUTION

Each Party shall execute this Amended Consent Decree by signing the signature page and furnishing the signed signature page to EPA. This Agreement may be executed and delivered in any number of counterparts, each of which, when executed and delivered, shall be deemed to be an original, but such counterparts together constitute one and the same document.

XLII. FINAL JUDGMENT

This Amended Consent Decree and its appendices constitute the final, complete, and exclusive agreement and understanding among the parties with respect to the settlement embodied in the Amended Consent Decree. The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Amended Consent Decree. This Amended Consent Decree supercedes the 1991 Consent Decree; provided, however, that the provisions of Sections XIX, XXX and XXXI of the 1991 Consent Decree will remain in full force and effect. Upon approval and entry of this Amended Consent Decree by the Court, this Amended Consent Decree shall constitute a final judgment between and among the United States, the State, the City, SRP, and the Participating Companies. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

SO ORDERED THIS 5 DAY OF June, 2003.

United States District Judge

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR THE UNITED STATES OF AMERICA

Date

W. Benjamin Fisherow
Deputy Chief
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

Date

Patricia L. Hurst
Trial Attorney
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

Date

Michael A. Johns, Arizona Bar No. 3803
Civil Chief
Office of the United States Attorney
District of Arizona
U.S. Department of Justice
Two Renaissance Square
40 N. Central Avenue, Suite 1200
Phoenix, Arizona 85004-4408

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR THE STATE OF ARIZONA

Date

Joseph C. Smith, Director
Arizona Department of Water Resources
500 North Third Street
Phoenix, AZ 85004

Date

W. Patrick Schiffer, Acting Chief Counsel
Arizona Department of Water Resources
500 North Third Street
Phoenix, AZ 85004

10.9.02
Date

Shannon M. Davis, Director
Arizona Department of Environmental Quality
Waste Programs Division
1110 West Washington Street
Phoenix, AZ 85007

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR THE STATE OF ARIZONA

9 OCT 02
Date

Joseph C. Smith, Director
Arizona Department of Water Resources
500 North Third Street
Phoenix, AZ 85004

10.09.02
Date

W. Patrick Schiffer, Acting Chief Counsel
Arizona Department of Water Resources
500 North Third Street
Phoenix, AZ 85004

Counsel for ADWR

Date

Shannon M. Davis, Director
Arizona Department of Environmental Quality
Waste Programs Division
1110 West Washington Street
Phoenix, AZ 85007

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR THE CITY OF SCOTTSDALE, an Arizona Municipal Corporation

10-21-07
Date

Mary Manross, Mayor
Scottsdale City Hall
3939 Drinkwater Boulevard
Scottsdale, AZ 85251

ATTEST:

Sonia Robertson
City Clerk
Scottsdale City Hall
3939 Drinkwater Boulevard
Scottsdale, AZ 85251

APPROVED AS TO FORM:

David A. Pennartz
City Attorney
Scottsdale City Hall
3939 Drinkwater Boulevard
Scottsdale, AZ 85251

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR THE SALT RIVER VALLEY WATER USERS' ASSOCIATION

October 7, 2002
Date

William P. Schrader
President
Salt River Project
1521 N. Project Drive
Tempe, Arizona 85281

ATTEST:

By David A. Hinton
Its Corporate Secretary

APPROVED AS TO FORM:

Karen Sinodis Gaylord
Salmon, Lewis & Weldon, P.L.C.
Counsel for SRP

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

10-7-02
Date

Keith Takata
Director, Superfund Division
Region IX
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA. 94105

October 7, 2002
Date

Michele S. Benson
Assistant Regional Counsel
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street (ORC 3-1)
San Francisco, CA. 94105

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR MOTOROLA, INC.

10-9-02
Date

Donald R. Netko
Vice-President and Director
Regional Environmental Affairs
Motorola, Inc.
3102 N. 56th Street, MD 56-128
Phoenix, Arizona 85018

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR GLAXOSMITHKLINE

October 9 2002
Date

Donald F. Parman
Vice President

THE UNDERSIGNED PARTY enters into this Amended Consent Decree in the matter of United States v. Motorola Inc., CV No. 91-1835-PHX-WPC, relating to the NIBW Superfund Site.

FOR SIEMENS CORPORATION

7 October 2002
Date

David Stryker
Chairman
SMI Holding LLC
153 East 53rd Street, Suite 5600
New York, NY 10022

APPENDIX A

STATEMENT OF WORK FOR
REMEDIAL DESIGN AND REMEDIAL ACTION
APPENDIX A TO THE AMENDED CONSENT DECREE

North Indian Bend Wash Superfund Site
Final Operable Unit

I. Introduction

This Statement of Work (SOW) describes the respective activities the Participating Companies, SRP, and the City must perform in order to design and construct all future remedy components as well as operate, maintain, monitor, and evaluate the final remedial action for the North Indian Bend Wash Superfund Site (NIBW or "the Site"), as described in the Record of Decision Amendment (Amended ROD), dated September 27, 2001, and any clarifications. This SOW is Appendix A to the Amended Consent Decree.

In general, the 1988 Record of Decision and Amended ROD include remedial actions selected by EPA to respond to hazardous substance releases from various industrial facilities in the vicinity of Scottsdale, Arizona. The NIBW Remedy primarily includes extraction and treatment of the groundwater at four separate locations throughout the Site. The volatile organic compounds (VOCs) listed in Table 1 of the Amended ROD (Appendix B to the Amended Consent Decree) are the NIBW Contaminants of Concern.

EPA intends to review deliverables and NIBW Site data to assess whether or not the remedial action continues to achieve the remedial objectives and performance standards set forth in the Amended ROD and this SOW. EPA review or approval of a future task or deliverable shall not, however, be construed as a guarantee of the adequacy of the performance of such task.

The definitions set forth in Section I of the Amended Consent Decree shall apply to this SOW unless expressly provided otherwise herein.

II. Summary of the NIBW Remedial Action

The selected remedy requires groundwater containment in the Middle and Lower Alluvial Units (also known as MAU and LAU), restoration of the groundwater to drinking water standards via removal of the NIBW Contaminants of Concern as described in VIII.A. of the Amended ROD, groundwater extraction focusing on four separate areas at NIBW, continued groundwater monitoring in the Upper Alluvial Unit (UAU), MAU, and LAU, periodic updates to the groundwater model as described in the Groundwater Monitoring and Evaluation Plan (GM&EP), installation of one new extraction well and one new recharge well, and treatment of the extracted groundwater using a series of treatment facilities.

The Participating Companies shall continue to monitor the groundwater in the UAU, MAU, and LAU in accordance with the Amended ROD and this SOW. The Participating Companies shall achieve containment of the groundwater plume(s) in the MAU and LAU as measured, at least in part, by monitoring of sentinel wells and demonstration of hydraulic gradients toward extraction wells in accordance with the groundwater containment performance standards in Section III.A. of this SOW. Hereinafter the term "sentinel wells" will be replaced by "indicator wells".

At NIBW, most of the components of the selected remedy have been designed and constructed either as requirements of previous RODs and Consent Decrees or as voluntary actions. The Amended Consent Decree requires continued operation and maintenance (O&M) of the existing extraction and treatment systems. The following plans, including but not limited to all current operation and maintenance plans, long-term sampling plans, quality assurance project plans, and health and safety plans will be revisited to ensure compliance with the Amended ROD and this SOW.

At this time, it has not been adequately documented that the soil cleanup action at Area 7 has been completed. In October 2001, EPA commented on the Area 7 Operations and Evaluation Report - Soil Vapor Extraction (SVE Report). This SVE Report requested EPA approval to close out the SVE system at Area 7. EPA received a revised version of the SVE Report on May 24, 2002. This document has been reviewed by EPA and ADEQ. At this time, EPA and ADEQ are requesting additional data before closure of the Area 7 SVE system can be approved.

III. Performance Standards

The Participating Companies, SRP and the City shall meet their respective obligations as set forth herein and in the Amended Consent Decree in order to implement the Performance Standards, Remedial Action Objectives (RAOs) and ARARs set forth in the Amended ROD.

All compliance monitoring data shall be reported in the NIBW Annual Site Monitoring Report, and Quarterly Reports submitted by the Participating Companies and in the Compliance Monitoring Reports (CMRs) submitted by the City. Quarterly Reports will include groundwater monitoring data for that quarter as well as performance monitoring data from the MRTF, Area 7 Plant and Area 12 Plant. CMRs will include performance monitoring data for the CGTF. Quarterly Reports, CMRs, and Annual Site Monitoring Reports will be submitted as outlined in Section IV.H of this SOW.

The Performance Standards are further defined as follows:

A. Groundwater Containment Performance Standards

With respect to the MAU/LAU, Area 7 and Area 12, the Amended ROD requires that the remedial action provide sufficient hydraulic control of contaminated groundwater to meet the Performance Standards. The criteria necessary to demonstrate achievement of capture in each area shall be specified in the GM&EP and summarized in the Remedial Design/Remedial Action Work Plan (RD/RA Work Plan). Such criteria shall include, but not be limited to, the demonstration of hydraulic gradient toward extraction wells. The specific requirements for each individual capture zone are as follows:

1. MAU/LAU: The remedial action shall provide sufficient hydraulic control to prevent groundwater in the MAU/LAU with VOC contamination above the cleanup standards listed in Table 3 of the Amended ROD from migrating towards and ultimately impacting production wells that have not contained NIBW

Contaminants of Concern exceeding MCLs prior to the Effective Date of the Amended Consent Decree and which are not currently connected to an existing treatment facility. In addition to demonstration of hydraulic capture within the MAU/LAU, it must also be demonstrated that contamination in the MAU outside the source areas (i.e., Area 7 and Area 12) is being reduced. Sections 4.2 and 4.3 of the GM&EP detail the criteria and compliance measurements that will be used to demonstrate capture in the MAU/LAU.

In the event that groundwater containment Performance Standards or achievement measures are not met, the Participating Companies shall take action to achieve or maintain capture through the initiation of contingency actions as provided for in the GM&EP. In such event, the City and SRP shall cooperate and provide information, as set forth in the Amended Consent Decree.

2. Area 7 and Area 12: The original purpose of the groundwater extraction systems at Area 7 and Area 12 was to reduce the mass of groundwater contamination at these source areas and to achieve overall reduction in contaminant concentrations for NIBW Contaminants of Concern. The remedial action shall provide sufficient hydraulic control to prevent MAU groundwater in the vicinity of Area 7 and Area 12 with a concentration that is higher relative to concentrations in the surrounding vicinity from migrating away from the source area. The most important aspect of this requirement is that the source area pumping minimizes the total amount of NIBW Contaminants of Concern that are allowed to migrate toward the southwest margin. The actual physical location of these capture zones and the compliance measurements associated with these zones are defined in Section 4.4 of the GM&EP .

The Participating Companies shall demonstrate compliance with these capture requirements by conducting compliance monitoring in accordance with the EPA-approved GM&EP. Section 3.1.3.1 of the GM&EP includes a process for evaluation of the adequacy of the monitoring well network. The RD/RA Work Plan will include a procedure for installation of new indicator wells, in case EPA determines that the existing monitoring wells are not adequate to demonstrate plume containment within the MAU/LAU, at Area 7, or at Area 12.

B. Groundwater Monitoring Performance Standards

The current groundwater monitoring program at NIBW includes collection of data by several different parties and submittal of several individual reports/data packages in accordance with the previous NIBW RODs and previous Consent Decrees. Until the GM&EP is approved, the Participating Companies and SRP shall adhere to these groundwater monitoring requirements. In accordance with the Amended ROD and this SOW, the GM&EP is under development and combines the groundwater monitoring and reporting requirements into one consolidated effort. A Sampling and Analysis Plan (SAP) which includes a field sampling plan (FSP) and a quality assurance project plan (QAPP)

-- shall be developed to cover sampling activities presented in the GM&EP.

The goal of the GM&EP is to make the groundwater monitoring program less repetitive and less cumbersome and to make the resulting groundwater data reports more valuable to all interested parties, including the public. Following EPA approval of the Phase I SAP associated with the GM&EP, the GM&EP shall be implemented. Once the GM&EP and its associated SAP are approved, these documents supercede all previous groundwater monitoring and reporting requirements, including groundwater monitoring requirements in the 1993 Consent Decree.

C. **Groundwater Treatment Performance Standards**

The Participating Companies and the City shall treat all groundwater that is extracted pursuant to this SOW for NIBW Contaminants of Concern at their respective facilities. Such groundwater shall be treated using air stripping at the Central Groundwater Treatment Facility (CGTF) operated by the City, and the Miller Road Treatment Facility (MRTF) and Area 12 Groundwater Extraction and Treatment System (GWETS), operated by the Participating Companies. Extracted groundwater treated at the Area 7 GWETS shall use a combination of Ultraviolet (UV) Oxidation and/or air stripping. The Area 7 GWETS is operated by the Participating Companies. If alternative treatment technologies are proposed, EPA will evaluate the alternative technologies in accordance with the criteria specified in 40 C.F.R. § 300.430.

Treated Groundwater from the CGTF and the MRTF shall meet the cleanup standards set forth in Table 3 of the Amended ROD. Response procedures associated with exceedances of cleanup standards at the CGTF and the MRTF are outlined in Sections VII.C.7 and VII.G.13 of the Amended Consent Decree, respectively. Treated Groundwater from the Area 7 Plant shall meet the cleanup standards set forth in Section XII.B.7.b of the Amended ROD.

Treated Groundwater from the Area 12 GWETS shall meet the cleanup standards set forth in Section XII.B.7.b of the Amended ROD; provided however, that if the United States or the State imposes more stringent requirements on the Grand Canal as a result of new uses on the Canal, the Treated Groundwater from the Area 12 GWETS shall meet those requirements. In addition, introduction of Treated Groundwater into a public water supply is an activity that must comply with all other State and federal requirements in effect at the time of the activity.

CGTF Treated Groundwater will either be provided to customers of the City for use as a drinking water supply or discharged to the SRP water supply system through a lateral that feeds the Grand Canal. Treated Groundwater from the MRTF that has been extracted from PCX-1 will be discharged to the SRP water supply system at the Arizona Canal. Except for lawful exchanges, water from PCX-1 may not be sold, disposed of, distributed, or delivered for use on lands not lawfully entitled to receive water from or through the works or facilities of SRP. Other extracted groundwater treated at the MRTF will either

be provided to customers of the water purveyor for use as a drinking water supply or discharged to the SRP water supply system at the Arizona Canal. Extracted groundwater treated at the Area 12 GWETS will be discharged to the SRP water supply system through a lateral that feeds the Grand Canal. Extracted groundwater treated at the Area 7 GWETS will be reinjected.

Operation of the CGTF, MRTF, Area 7 groundwater treatment plant and the Area 12 groundwater treatment plant (NIBW treatment plants) and associated equipment shall meet the ARARs identified in Attachment 1 to the Amended ROD.

D. Operation and Maintenance

The Sitewide Operation and Maintenance Plan (Sitewide O&M Plan) for the NIBW treatment plants, the groundwater monitoring well network and the groundwater extraction well network shall be developed or updated, as appropriate, to ensure that the remedy is operating in compliance with all requirements of the Amended ROD and the Amended Consent Decree. The Sitewide O&M Plan shall represent a sitewide strategy for operation and maintenance activities. The CGTF O&M Plan shall be included as a section or an appendix of the Sitewide O&M Plan.

The CGTF O&M Plan and the Sitewide O&M Plan shall be subject to EPA approval. O&M requirements are discussed in further detail in Section IV.E. of this SOW.

E. Additional Requirements

1. Area 7: Groundwater

The Area 7 groundwater treatment plant has been upgraded to accommodate increased production from the new extraction well in accordance with the Area 7 Work Plan and Start-Up Plan Groundwater Extraction Well 7EX-5MA approved by EPA on March 18, 2002. EPA approved initiation of routine operations at extraction well 7EX-5MA on January 29, 2002.

Groundwater extraction from the UAU at Area 7 may be terminated as performance objectives are achieved. Such termination may occur following submittal of a proposal in writing by the Participating Companies and approval of such proposal by EPA.

2. Area 7: Soil

The soil cleanup action currently in progress at Area 7 shall be completed in accordance with the NIBW Record of Decision dated September 1991 (1991 ROD), the 1993 Consent Decree, and the associated work plans previously approved by EPA.

3. Communication Plan

A Communication Plan shall be developed in conjunction with the RD/RA Work Plan that will outline the public notification requirements for specific events that may occur during operation of the NIBW treatment systems. The Communications Plan is discussed in greater detail in Section IV.B.14 of this SOW.

IV. List of Deliverables and Other Tasks

Participating Companies, SRP, and/or the City shall submit their respective deliverables for EPA review and approval, as specified below. At least two copies of each deliverable shall be submitted to EPA, the Arizona Department of Environmental Quality (ADEQ), and the Arizona Department of Water Resources (ADWR) for review. One copy of each final deliverable shall also be provided in a generally accessible electronic format. Copies of all deliverables shall be provided as stated in Section X.B.5. and Section X.B.6. of the Amended Consent Decree. Information presented in color must be legible and interpretable when reproduced in black and white.

Participating Companies, SRP, and/or the City shall implement quality control procedures to ensure the quality of their respective reports and submittals to EPA. These procedures shall include but are not limited to internal technical and editorial review; verification of calculations; and documentation of all reviews, problems identified, and corrective actions taken.

As described in Section X.B.3. of the Amended Consent Decree, EPA may object to deliverables submitted for approval. Major deliverables are described below and shall be submitted according to the schedule in Section V of this SOW.

To the extent that any deliverable requires information from any Party other than the Party responsible for the submission of the deliverable, such other Party will provide any necessary information in a timely and complete manner.

Unless otherwise stated, all deliverables are subject to EPA approval.

A. Groundwater Monitoring and Evaluation Program

Participating Companies have submitted a Groundwater Monitoring and Evaluation Plan (GM&EP) to EPA and the State. The GM&EP outlines the strategy for combining all of the groundwater monitoring efforts currently required by previous RODs and Consent Decrees into one sampling and evaluation effort. The GM&EP shall be subject to EPA approval. The GM&EP includes a procedure for identifying the future need for additional monitoring wells for plume definition or capture demonstrations. The procedures for installation of such wells will be included in the RD/RA Work Plan.

Following EPA approval of the GM&EP (and associated sampling and analysis plan, see below), the Participating Companies, and SRP until March 2013, shall implement the

GM&EP. The GM&EP supercedes all previous NIBW groundwater monitoring requirements (including groundwater monitoring requirements in the 1993 Consent Decree).

The GM&EP outlines the reporting requirements for all of the data collected as part of the groundwater monitoring and evaluation program. These reporting requirements include Quarterly Reports and an Annual Site Monitoring Report. The Quarterly Report shall be an electronic submittal of groundwater monitoring data and other information and shall include a brief narrative summary. Quarterly Reports are described further in the GM&EP and in Section IV.H below. The Annual Site Monitoring Report shall include the following information and is described further in the GM&EP:

1. Tabulations of raw data;
2. Water level contour maps;
3. Water level change evaluations;
4. TCE concentration contour maps;
5. TCE concentration change evaluations;
6. Pumping maps and summaries;
7. UAU mass flux analysis;
8. Maps showing TCE concentration contours and estimated hydraulic capture for Area 7, Area 12 and the MAU/LAU;
9. Water level and TCE concentration hydrographs for Area 7, Area 12, and the MAU/LAU indicator wells;
10. Summary of volume pumped and TCE mass removed at Area 7, Area 12, the CGTF and the MRTF;
11. Summary of remediation program activities and submittals;
12. Summary of recommended adjustments to scope and frequency of monitoring activities to optimize program effectiveness over time;
13. Groundwater modeling activities and results as described in the GM&EP;
14. Assessment of groundwater monitoring and groundwater containment Performance Standards;
15. Documentation of achievement of groundwater containment Performance Standards; and
16. A qualitative discussion of progress toward achievement of remedial action objectives.

The GM&EP also includes contingency initiation criteria that trigger applicable contingency response actions. Within 10 days after contingency response actions have been triggered, the Participating Companies shall confirm the data, investigate potential data errors, and resample the affected wells. If resampling of wells indicates that original sampling results were incorrect, the Participating Companies shall resample during the following quarter to confirm. If results of the confirmation sample verify that original sampling results were incorrect, no further contingency response actions shall be necessary at that time.

Within 35 days following receipt of resampling results that indicate that the original sampling results were correct, the Participating Companies shall:

1. Evaluate the potential impact to peripheral production wells;
2. Prepare a contingency workplan;
3. Provide copies of the contingency work plan to EPA, the State and the interested Parties;
4. Hold a meeting with the Parties to discuss the contingency workplan; and
5. Submit the work plan to EPA for approval. EPA will approve the work plan in consultation with the State.

The contingency workplan shall describe appropriate contingency response actions to be initiated within specific timeframes and completed pursuant to schedules set forth in the workplan. The contingency workplan may include, but shall not be limited to, one or more of the following:

6. Modeling analysis;
7. Evaluation of remedy enhancements, including but not limited to installation of pumping equipment, piping, and treatment equipment to provide for extraction, conveyance, and treatment of wells contaminated due to loss of capture; and
8. Implementation of remedy enhancements, including but not limited to installation of pumping equipment, piping, and treatment equipment to provide for extraction, conveyance, and treatment of wells contaminated due to loss of capture.

The Quarterly Reports and the NIBW Annual Site Monitoring Reports shall be submitted according to the schedule in Section V of this SOW.

A SAP and Health and Safety Plan (HASP) shall be developed to accompany the activities required by the GM&EP. This SAP and HASP shall comply with Sections IV.G. and IV.I. of this SOW, respectively.[1]

B. Remedial Design/Remedial Action Work Plan

The Participating Companies shall submit a work plan which describes the management strategy for implementation of the RD/RA Work Plan. Since the NIBW remedial action has already been designed and constructed, the RD/RA Work Plan will primarily include Site management information and documentation of completion of the existing remedy

[1] The GM&EP SAP (or Phase I SAP) can be an updated version of the SRP SAP and QA/QC Plan dated November 1992, but must still undergo EPA review and approval. The GM&EP SAP and HASP have to be submitted first due to the timing of implementation of the GM&EP and will be considered the Phase I SAP and HASP. The overall NIBW site Phase II SAP and HASP will be submitted at a later date in accordance with Section V of this SOW.

components.

The RD/RA Work Plan is subject to EPA approval. In general, the RD/RA Work Plan shall include a description of all work that has and will be implemented by Participating Companies, SRP and the City in accordance with the Amended ROD and this SOW. To the extent that any element of the RD/RA Work Plan is included in any other NIBW document previously submitted to EPA, such element may be described in a summary manner in the RD/RA Work Plan with incorporation by reference to the appropriate document. The section and page numbers of any referenced document must be included in the RD/RA Work Plan.

Specifically the RD/RA Work Plan shall include, but not be limited to, the following:

1. Identification of the criteria necessary to demonstrate achievement of capture at Area 7, Area 12 and the MAU/LAU including:
   a. Identification of indicator wells in all three areas; and
   b. Identification of all data sources that will be utilized to demonstrate capture in all three areas.

2. A summary of procedures to be implemented in the event that an effluent sample from the CGTF or MRTF exceeds a cleanup level as set forth in the Sitewide O&M Plan, including:
   a. Procedures that will be implemented to ensure that customers are served water that meets the cleanup standards;
   b. Procedures for collection of confirmation samples to verify exceedance of a cleanup standard; and
   c. Measures that must be taken to ensure that the plant (or specific treatment tower) is operating properly.

3. A summary description of compliance monitoring activities to be conducted at each of the treatment facilities, extraction systems and the groundwater monitoring network. The O&M Plan for each individual facility may be referenced if the documents have been approved by EPA and adequate compliance monitoring information is included in such documents. The GM&EP may be referenced for the description of performance of the groundwater extraction and monitoring systems. The following information shall be provided;

   a. **Treatment System Performance** - Participating Companies shall describe the approach to ensure that groundwater is treated to meet the groundwater treatment Performance Standards identified in Section III.C. of this SOW for the CGTF, MRTF, Area 7, and Area 12 treatment systems. Additionally the RD/RA Work Plan shall specify how the Participating Companies and the City are to use the Treated Groundwater to comply with the ARARs identified in the Amended ROD. The RD/RA Work Plan shall specify the type, location, and frequency of the sampling

activities to be conducted during operation of each of the treatment systems to establish and monitor acceptable performance of the systems. The RD/RA Work Plan shall also outline other measures to be taken to ensure that the systems are in good working condition.

b. **Extraction System Performance** - Participating Companies shall describe how capture is maintained to achieve Groundwater Containment Performance Standards. The RD/RA Work Plan shall address how the evaluation of capture will be demonstrated (*i.e.*, through the use of a groundwater monitoring network) for the groundwater extraction and treatment systems at the source areas (Area 7 and Area 12) and for the overall capture of the MAU/ LAU plume. The RD/RA Work Plan shall also outline other measures to be taken to ensure that the extraction well systems are in good working condition.

c. **Groundwater Monitoring Network Performance** - The RD/RA Work Plan shall identify the number, location, and specifications of wells to be included in the groundwater monitoring network. The Participating Companies shall identify areas of potential data gaps. If data gaps are identified, actions may include the installation of additional wells or the addition of wells previously not included as part the monitoring network.

4. A list and short description of each deliverable, including progress reports, that will be submitted as part of the Work required by the Amended Consent Decree.

5. A description of the information to be provided in the Quarterly Reports, CMRs, and Annual Site Monitoring Reports to be submitted in accordance with Sections VII.C.9 and X.A.2 of the Amended Consent Decree.

6. A description of facility inspections that have been or will be completed for each plant and the status of Operational and Functional (O&F)[2] determinations for each plant.

7. Information equivalent to the requirements for Remedial Action Reports (RA Report) as defined specifically in Exhibit 2-3 of the EPA guidance entitled, "Close Out Procedures for National Priorities List Sites" (EPA-540-R-98-016, January 2000). A statement shall be included in the RD/RA Work Plan that indicates that such information is intended to meet the requirements of an Interim RA Report for

[2] "Operational and Functional" is generally defined for NIBW as ensuring that the overall extraction and treatment system is meeting the design and operation specifications, requirements, and goals. This process may be applied to individual treatment facilities, a combination of treatment facilities or the Site as a whole. Since almost all of the SVE work has been completed, inspections of and O&F determinations for the various SVE systems at NIBW are not required.

each of the four treatment facilities.

8. Plans to implement a remedy optimization evaluation may be included, if appropriate.

9. Procedures for coordination with EPA and the State for collection of split or replicate samples.

10. A description of facilities and equipment, specifically including:
    a. A description of existing equipment and facilities to be used as part of the remedial action; and other key aspects of the project;
    b. A discussion of the condition, anticipated longevity, and any limitations in the use of each existing facility and associated wells and equipment;
    c. Recommendations for any repairs, upgrades, rehabilitation or replacement of existing equipment that will be necessary to ensure efficient operation of the remedy until such a time that the cleanup standards have been achieved.

11. A description of the responsibility and authority of all organizations and key personnel involved with the remedial action. Lines of authority shall be defined and a brief description of duties shall be included for the following key personnel:
    a. Participating Companies' Project Coordinators;
    b. Representatives for each of the Participating Companies;
    c. Representatives of the City;
    d. SRP representatives;
    e. The primary operators of each of the facilities; and
    f. A description of the roles and responsibilities of each Party expected to play a role in the implementation or operation of the remedial action.

12. A schedule including the following items:
    a. The initiation and completion dates for each activity and deliverable required by the Amended Consent Decree and this SOW;
    b. The approximate timing of meetings and other activities which may require EPA participation, but are not identified in Section V of this SOW.

13. A list of all permits, property, leases, and easements required for implementation and continued operation of the remedial action, if any; permits, property, leases, and easements acquired to date; and a schedule for submittal of permit applications and acquisition of property, leases, or easements not yet obtained, if appropriate.

    Where normally required, permits must be obtained for all offsite activities. Except as provided in the Amended Consent Decree, the Parties are not required to obtain permits for on-site remedial activities, but must comply with all substantive

requirements, including local building codes. If permits will not be obtained for an on-site activity where a permit is normally required, the Parties shall describe all consultative or coordination activities planned to identify and satisfy the substantive requirements.

14. A description of planned community relations activities to be conducted during remedial design or remedial action. In accordance with Section XXXIV of the Amended Consent Decree, the Participating Companies, the City, and SRP shall work cooperatively with EPA and the State in providing information regarding the Work to the public. As requested by EPA or the State, the Participating Companies, the City, and SRP shall participate in the preparation of such information for dissemination to the public and in community meetings which will be conducted by EPA to explain activities at or relating to the Site.

15. A plan and system to manage and organize data collected pursuant to Section XVII.E of the Amended Consent Decree.

16. A description of how the RD/RA Work Plan will be updated as needed to document changes or provide information not available at the time the RD/RA Work Plan is submitted. If any of the information requested is not known at the time the RD/RA Work Plan must be submitted, and omitting the information from the RD/RA Work Plan will not prevent compliance with any other requirements of this SOW, Participating Companies may submit the information at a later date. If any information is omitted, Participating Companies shall note in the RD/RA Work Plan that the missing information was not available and specify when it will be submitted.

17. A summary description of groundwater containment performance criteria and contingency triggers as identified in the GM&EP.

C. Remedial Design

At NIBW, the necessary treatment facilities have already been designed and constructed and are currently operating. However, there may be components of the remedy that may require design activities in the future (*e.g.*, treatment plant modifications similar to those implemented at the CGTF).

Such remedial design activities shall include the preparation of clear and comprehensive design documents, construction plans and specifications, and other design activities needed to implement the work and satisfy Performance Standards set forth in the Amended ROD and this SOW. All plans and specifications shall be developed in accordance with relevant portions of EPA's Superfund Remedial Design/Remedial Action Handbook (EPA 540/R-95/059), and in accordance with the Design Schedule. The Design Schedule shall be submitted in accordance with the schedule set forth in Section V of this SOW. The Parties may request a stream-lined design process to limit the design elements and/or required

deliverables for any future components, as appropriate. EPA may in its sole discretion, determine that all design phases are not necessary for a particular remedy component or that the design requirements identified in the SOW are not necessary at all. If this is the case, EPA will identify which remedial design documents, if any, will be required.

1. **Conceptual/Preliminary Design**

A Conceptual/Preliminary Design shall be submitted in accordance with the schedule included in Section V of this SOW. EPA approval is required before proceeding with further design work, unless EPA agrees otherwise. It is assumed that the design-build contractor will prepare the Conceptual/Preliminary Design and subsequent design submittals. Unless modified by EPA, the Conceptual/Preliminary Design submittal shall include or address, at a minimum, the following:

a. A detailed Design Basis Report that presents and justifies the concepts, assumptions, standards, and preliminary interpretations and calculations used in the design. The Design Basis Report shall include:

(1) Volume or flow rate of water, brine, air, sludge, and other media requiring treatment or disposal;

(2) A summary of water quality or other data to be used during design but not previously provided to EPA, along with an analysis of whether the data confirm assumptions, recommendations, or conclusions made to date;

(3) Assumed treatment plant influent quality over the design life of the treatment system, with a description of the methodology used to develop the estimate (including discussion of the likelihood and magnitude of short-term and long-term changes in influent concentrations);

(4) An explanation of how Performance Standards will be met;

(5) Discussion of any proposed or anticipated State or Federal drinking water or ambient water quality standards that would impact the design;

(6) Filtration, disinfection, corrosion control, or other treatment requirements in addition to removal of site contaminants, if any;

(7) Assumed treatment technologies and/or treatment trains (for all media and byproducts) and initial treatment process flow diagrams;

(8) Preliminary sizing of treatment system and other remedial action components;

(9) Expected treatment facility removal capacity for all groundwater constituents requiring removal;

(10) Delivery locations, rates, and pressures for the Treated Groundwater, and other conveyance system assumptions for supplying or discharging treated groundwater;

(11) Provisions for alternative use of Treated Groundwater;

(12) Interconnection requirements for delivery of Treated Groundwater, if any (e.g., connection to existing water distribution systems);

(13) The degree of automation and planned level of operator oversight;

(14) System control strategy, including the level of reliability, redundancy, or specific damage prevention features needed in each major component of the remedial action to respond to seismic events, power outages, equipment failure, system maintenance, operator error, or deviations from design assumptions;

(15) Listing and discussion of the relative importance of siting criteria for new extraction wells, treatment facilities, pipelines, and other facilities, along with preliminary locations and alignments; and

(16) Estimate of the distance from each proposed extraction location to the location assumed in computer model simulations completed in support of the NIBW containment remedial action and an evaluation of whether additional computer modeling activities are needed to verify the effectiveness of the actual extraction locations;

b. An assessment of the operational reliability of the proposed treatment system;

c. An updated construction schedule for construction and implementation of the remedial action which identifies timing for initiation and completion of all critical path tasks;

d. An updated list of permits, regulatory agency approvals, access or use agreements, easements, and properties developed or acquired to date;

copies of permits, approvals, and agreements not previously supplied to EPA; activities and schedules for obtaining outstanding items required before start of construction (e.g., for use of existing facilities or disposition of the treated water); and any applicable expiration dates for access agreements or permits;

e. Preliminary plan, specifications, and drawings of groundwater extraction, treatment, conveyance, and monitoring systems. It is assumed that a design-build contractor will be used; and

f. Outline of required specifications.

2. Intermediate Design

The intermediate design begins at the completion of the preliminary design phase and ends with the completion of approximately 60 percent of the total design effort. The Intermediate Design, which shall consist of a continuation and expansion of the Preliminary Design, shall be submitted to EPA. Review comments on the Preliminary Design shall be reflected in the Intermediate Design. A Value Engineering (VE) Study shall be performed based on approved recommendations from the VE screening submitted with the Preliminary Design. The Intermediate Design documents shall be submitted in accordance with the schedule included in Section V of this SOW and shall consist of the following subtasks:

a. Update Construction Schedule

The schedule for implementation of the remedial action shall identify the timing for initiation and completion of all critical path tasks. The schedule shall specifically identify duration for completion of the project and major milestones.

b. Prepare Intermediate Specifications

Plans and specifications shall conform to acceptable standards. Plans and specifications shall include preliminary specifications for construction, installation, site preparation, and field work standards, including an equipment startup and operator training plan. A table of contents for the general specifications shall be provided with this submittal.

c. Prepare Intermediate Drawings

An outline or listing of drawings shall be submitted, including: facility representations containing a process flow diagram; a piping and instrumentation diagram; a control logic table; and continuation and

expansion of drawings submitted with the Preliminary Plans and Specifications. The Intermediate Design should include engineering drawings for grading/paving, foundation, and electrical, structural, and mechanical elements, etc.

d. Prepare and Submit Revised Basis of Design Report

A revised summary of the evaluations conducted to select the design approach as part of the Revised Basis of Design Report shall be submitted. The report shall include the following components:

(1) Summary and Detailed Justification of Assumptions. This summary shall include:
   (a) Design calculations supporting the assumptions;
   (b) A revised process flow diagram;
   (c) A detailed evaluation of how ARARs will be met;
   (d) A plan for minimization of environmental and public impacts; and
   (e) Heat and mass balances, as appropriate.

(2) Plan for Satisfying Permitting Requirements.

EPA comments shall be incorporated into a Permits Plan.

(3) Identification of Easement and Access Requirements.

The need for land acquisitions for access and easement requirements shall be identified and submitted as part of the Intermediate Design.

(4) Identification of the projected O&M requirements.

e. Describe Variances with the Amended ROD

If it is found that the remedial action being designed differs from the Amended ROD, or that an ARAR cannot be met, EPA and the State shall be notified orally within 48 hours of receipt of such knowledge and within 7 days of oral notification, EPA and the State Project Coordinators shall be notified in writing. Such notification shall be followed by a detailed written description of the issue and recommend technical solutions in a technical memorandum to EPA and the State.

3. Pre-final/Final Design

The Pre-final Design shall be submitted when the design effort is complete in

accordance with the schedule included in Section V of this SOW. The Pre-final Design shall fully address all comments made on the Intermediate Design Report, and if not previously addressed, be accompanied by a memorandum indicating how the comments were incorporated into the Prefinal Design. The Prefinal Design documents shall be certified by a Professional Engineer registered in the State of Arizona.

The Pre-final Design shall serve as the Final Design if EPA has no further comments and provides its approval. The Pre-final Design submittals shall include reproducible drawings and specifications; and a complete set of construction drawings in full and one-half size reduction. The Final Design should also include a schedule for construction complete, and satisfaction of the "Operational and Functional" criteria. "Operational and Functional" criteria are generally defined as ensuring that the overall extraction and treatment system is meeting the design and operation specifications, requirements, and goals.

D. Future Remedial Action

With the exception of Additional Site Work, replacement of PCX-1 upon failure, replacement of Granite Reef Well upon failure (for which no determination is currently being made), any construction that is necessary as part of the remedial action shall be implemented by the Participating Companies. During the design period, in preparation for implementation of the remedial action and in accordance with the schedule included in Section V of this SOW, a Construction Quality Assurance Plan, a Construction Health and Safety Plan, and any needed updates to the RD/RA Work Plan shall be submitted. See Section IV.D.3 and IV.D.4 of this SOW for a discussion of these construction plans. The Construction Quality Assurance Plan must be reviewed and approved by EPA prior to the initiation of any construction that is part of the remedial action.

Upon approval of the Final Design and Construction Quality Assurance Plan, construction shall begin in accordance with the schedule in the updated RD/RA Work Plan (See Section IV.D.1 below). Significant field changes to the remedial action as set forth in the RD/RA Work Plan and Final Design shall not be undertaken without the approval of EPA. All work on the remedial action shall be documented in enough detail to produce as-built construction drawings after the remedial action is complete. Review and/or approval of submittals does not guarantee that the remedial action, when constructed, will meet the Performance Standards.

1. Remedial Action Work Plan

A separate Remedial Action Work Plan need not be submitted. Instead, supplemental information as necessary to update the RD/RA Work Plan shall be provided.

2. Pre-construction Meeting

A Pre-construction Meeting shall be held after selection of the construction contractor but before initiation of any significant construction. The meeting shall include Participating Companies, SRP and/or the City's representatives and interested federal, state and local government agency personnel; shall define the roles, relationships, and responsibilities of all parties; review work area security and safety protocols; review any access issues; review construction schedule; and review construction quality assurance procedures.

The results of the Pre-construction Meetings shall be documented and the meeting minutes transmitted to all parties in attendance, including a list of the names of people in attendance, issues discussed, clarifications made, and instructions issued.

3. **Construction Quality Assurance Plan**

A Construction Quality Assurance Plan (CQAP) shall be developed and implemented for any significant construction to ensure, with a reasonable degree of certainty, that the completed remedial action meets or exceeds all design criteria, plans and specifications, and Performance Standards. The Construction Quality Assurance Plan shall include the following elements:

a. Responsibilities and authorities of all organizations and key personnel involved in the design and construction of the remedial action;

b. A description of the quality control organization, including a chart showing lines of authority, members of the Quality Assurance team, their responsibilities and qualifications, and acknowledgment that the Quality Assurance team will implement the quality control system for all aspects of the work specified and shall report to the Project Coordinator for the Party or Parties responsible for construction and to EPA. Members of the Quality Assurance team shall have a good professional and ethical reputation, previous experience in the type of QA/QC activities to be implemented, and demonstrated capability to perform the required activities. They shall also be independent of the construction contractor;

c. Description of the observations, inspections, and control testing that will be used to assure quality workmanship, verify compliance with the plans and specifications, or meet other QC objectives during implementation of the remedial action. This includes identification of sample size, sample locations, and sample collection or testing frequency; and acceptance and rejection criteria. The CQAP shall specify laboratories to be used, and include information which certifies that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards;

d. Reporting procedures, frequency, and format for QA/QC activities. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQAP. The QA official shall report simultaneously to the representative of the Party or Parties responsible and to EPA; and

e. A list of definable features of the work to be performed. A definable feature of work is a task which is separate and distinct from other tasks and has separate quality control requirements.

4. Construction Health and Safety Plan

A Construction Health and Safety Plan (CHASP) shall be prepared for any significant construction in compliance with OSHA regulations and protocols and other applicable requirements. The CHASP shall describe health and safety risks, employee training, monitoring and personal protective equipment, medical monitoring, individuals responsible in an emergency, and provisions for site control for workers and for visitors to the job site. EPA will review but neither approve nor disapprove the CHASP.

5. Remedial Action Construction

The remedial action as detailed in the approved RD/RA Work Plan (as updated) and approved Final Design shall be implemented.

E. Inspections and Completion of Future Remedial Action

1. Pre-final Construction Inspections

When the Party or Parties responsible for construction believe that future remedial action construction is complete, in compliance with all ARARs, and the remedial action (or a discrete portion of the remedial action as outlined in the RD/RA Work Plan) is O&F, the Party or Parties responsible for construction shall notify EPA and the State for the purposes of conducting a Pre-final inspection to be attended by EPA, the State, and the Party or Parties responsible for construction. If a Pre-final Construction Inspection is held for a portion of the remedial action, one or more additional inspections will be required to ensure that the entire remedial action has been properly inspected.

The objective of the inspection(s) is to determine whether construction is complete, whether the facility is operating in compliance with ARARs, and whether the remedial action (or the inspected portion) is O&F. Any outstanding construction

items discovered during the inspection shall be identified and noted. Participating Companies shall certify that the equipment is meeting the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. A Pre-final Construction Inspection Report shall be submitted by the Party or Parties responsible for construction, which outlines the outstanding construction items, actions required to resolve the items, completion date for the items, and an anticipated date for a Final Inspection. The Pre-final Inspection Report can be in the form of a bullet list or letter. The Pre-final Inspection Report shall include a schedule for completion of any additional work deemed necessary.

2. **Final Construction Inspection**

Within fourteen (14) days after completion of any work identified in the Pre-final Inspection Report, the Party or Parties responsible for construction, shall notify the EPA and the State for the purposes of conducting a final inspection. The final inspection shall consist of a walk-through inspection by EPA, the State, and the Party or Parties responsible for construction. The Pre-final inspection report shall be used as a checklist with the final inspection focusing on the outstanding construction items identified in the Pre-final inspection. Confirmation shall be made that outstanding items have been resolved.

Any outstanding construction items discovered during the final inspection still requiring correction shall be identified and noted on a punch list. If any items are still unresolved, the inspection shall be considered to be a Pre-final Construction Inspection requiring another Pre-final Construction Inspection Report and subsequent Final Construction Inspection.

If at the time of a Pre-final inspection no items are identified that require follow-up, the requirement for a final inspection may be waived by EPA.

3. **Final Remedial Action Construction Complete Report**

As specified in the approved schedule included in Section V of this SOW, after construction is completed on the entire remedial action and all systems are O&F as intended, the Party or Parties responsible for construction, shall submit a Remedial Action Construction Completion Report. In the report, a registered Professional Engineer and Participating Companies' Project Coordinator shall state that the construction of the remedial action has been completed. The written report shall provide a synopsis of the work defined in this SOW, describe deviations from the design documents, include as-built drawings signed and stamped by a Professional Engineer, provide actual costs of the remedial action (and O&M to date), and provide a summary of the results of operational and performance monitoring completed to date. The report shall contain the following statement, signed by a responsible official of the Party or Parties responsible for construction:

"To the best of our knowledge, after thorough investigation, we certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

F. Operation and Maintenance

O&M shall be performed in accordance with the Sitewide O&M Plan and each individual facility's O&M Manual.[3] The Sitewide O&M Plan shall be submitted for approval by EPA and facility specific O&M Manuals shall be made available to EPA and the State in accordance with the schedule included in Section V of this SOW.

1. Operation and Maintenance Plan

As required by Sections XII.B.2.g., XII.B.3.e., XII.B.4.f., and XII.B.5.c. of the Amended ROD, the City shall revisit the O&M Plan for the CGTF and the Participating Companies shall revisit the O&M Plan for the MRTF, the Area 7 GWETS and the Area 12 GWETS. One Sitewide O&M Plan shall be developed from the existing O&M Plans that describes the O&M activities at each of the plants and provides a comprehensive document that covers all O&M activities at NIBW. Although development of the CGTF O&M Plan is on a more expedited schedule then the remaining facilities, it is anticipated that to CGTF O&M Plan will be incorporated into the Sitewide O&M Plan (as an appendix or a specific section).

Effort should be made to make O&M activities consistent between the facilities. For example, the frequency and type of samples collected should be as consistent as possible between the plants, as appropriate. A Phase II SAP, as identified in Section IV.G below, shall be prepared in association with the Sitewide O&M Plan that will provide for consistency in the quality of data collected for O&M purposes at NIBW.

The Sitewide O&M Plan shall also include O&M activities necessary for upkeep of the groundwater monitoring well network and groundwater extraction well network. The Sitewide O&M Plan should be associated with the O&M Manuals for each of the facilities, as described below. The CGTF O&M Plan and the Sitewide O&M Plan must be reviewed and approved by EPA.

2. Operation and Maintenance Manual(s)

[3] An O&M manual will not be required for the groundwater monitoring well network.

The City shall review and update the O&M Manual for the CGTF. The Participating Companies shall review and update the O&M Manuals for each of the remaining treatment facilities. If an O&M Manual does not exist for a facility then the Participating Companies or the City, as appropriate, shall develop one. These documents shall be developed for each plant and shall be housed at each individual plant.

The O&M Manuals shall include all necessary O&M information specifically for the personnel operating the plants. The O&M Manuals shall include, but not be limited to, the following:

a. System description;

b. Startup and shutdown procedures;

c. Description and schedule of normal operation and maintenance tasks, including equipment and material requirements, anticipated equipment replacement for significant components, availability of spare parts, provisions for remote monitoring and control, operator training and certification requirements, staffing needs, and related requirements;

d. Indicators of system performance and/or maintenance (e.g., parameters to be monitored to determine timing for activated carbon or ion exchange resin replacement, or to assess biological reactor performance); and

e. Operation troubleshooting guide.

The O&M Manuals shall be made available for EPA and State review, at each facility. EPA may review but will not approve or disapprove the O&M Manuals.

G. Sampling and Analysis Plan

SRP shall develop a Phase I SAP in accordance with Section VII.D.2 of the Amended Consent Decree. The Participating Companies shall develop a Phase II SAP in accordance with Section VII.B.5.b of the Amended Consent Decree. Each phase of the SAP shall include a Field Sampling Plan (FSP) as well as a Quality Assurance Project Plan (QAPP).

The Phase I SAP shall cover all groundwater sampling activities identified in the GM&EP. The Phase II SAP shall cover all O&M sampling, all compliance monitoring, and any other sampling activities associated with field investigations needed to complete construction activities and/or operation of the remedial action, including sampling required to demonstrate compliance with a current or future NPDES permit. The Phase I SAP shall identify the relationship between the Phase I and Phase II SAPs (collectively the SAP).

The SAP must adhere to EPA guidance, as appropriate. Although some guidance

documents are listed in this SOW for convenience, it is the responsibility of SRP and the Participating Companies to ensure that the most up-to-date guidance documents are followed. The most up-to-date Quality Assurance guidance documents can be found at: http://www.epa.gov/quality1/qa_docs.html.

The SAP must be reviewed and approved by EPA.

All analytical data required by the GM&EP or the Site-wide O&M Plan that is collected during a quarter shall be submitted in the Quarterly Report that is submitted sixty (60) days after the close of the calendar quarter. This data shall be in electronic format in an EPA-approved structure. Such structure shall be compatible with ADEQ's groundwater database and identified in the SAP.

All analytical data required by the CGTF O&M Plan that is collected during a quarter shall be submitted in the CMR that is submitted sixty (60) days after the close of the quarter.

Each Party using a laboratory shall demonstrate in advance and to EPA's satisfaction that each laboratory that may be used is qualified to conduct the proposed work and meets the requirements specified in Section XII.B.1 through 4 of the Amended Consent Decree. Laboratory selection is subject to EPA approval. A laboratory that has been approved for use by a Party, need not be approved again for use by another Party.

If any of the Parties chooses to use a non-Contract Laboratory Program (CLP) laboratory, then the proposed laboratory's Quality Assurance Plan must be submitted to EPA for review at or before the time that the SAP is submitted to EPA. EPA may require that Party to submit additional detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specification, and laboratory analyses of performance samples (blank and/or spike samples). In addition, data packages must be equivalent to those generated by the EPA CLP.

Participating Companies, SRP, and the City shall submit quality assurance reports for their respective sampling activities to EPA on an annual basis. These reports shall contain information that demonstrates that the laboratories used are complying with this Section and the quality assurance plans set forth in the SAP.

1. **Field Sampling Plan**

   The FSP shall describe sampling objectives, analytical parameters, sample locations and frequencies, sampling equipment and procedures, sample handling and analysis, management of investigation-derived wastes, and planned uses of the data. The FSP shall be consistent with the following EPA guidances: Guidance for Quality Assurance Project Plans (G-5), EPA/600/R-98/018, February 1998; Guidance for the Data Quality Objectives Process (G-4), EPA/600/R-96/055,

August 2000; Guidance for Data Quality Assessment: Practical Methods for Data Analysis (G-9), EPA/600/R-96/084, July 2000; Guidance for the Preparation of Standard Operating Procedures (G-6), EPA/240/B-01/004, March 2001; and other applicable guidance. This list is not intended to be all inclusive.

The FSP shall be written so that a field sampling team unfamiliar with the project would be able to gather the samples and field information required. The FSP shall include a schedule that describes activities that must be completed in advance of sampling, including acquisition of property, access agreements as needed, and arrangements for disposal of investigation-derived waste.

2. **Quality Assurance Project Plan**

The QAPP shall describe project objectives, organizational and functional activities, data quality objectives (DQOs), and quality assurance and quality control (QA/QC) protocols that shall be used to achieve the desired DQOs. The DQO's will be developed based on the current understanding of the constituents present, concentration of contaminants present in the groundwater, and monitoring and sampling history. The QAPP shall be consistent with the guidance documents identified in Section IV.G.1 and other applicable guidance. The DQOs shall, at a minimum, reflect use of analytical methods for obtaining data of sufficient quality to meet National Contingency Plan requirements as identified at 40 C.F.R. § 300.435 (b). In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, document control procedures, preservation of records (See Sections XII, XVII, and XVIII of the Amended Consent Decree), data reduction, data validation, data management, procedures that will be used to enter, store, correct, manipulate, and analyze data; protocols for transferring data to EPA in electronic format; and document management.

H. Quarterly Reports, Compliance Monitoring Reports, and Annual Site Monitoring Reports

Quarterly Reports, CMRs, and Annual Site Monitoring Reports shall be submitted in accordance with Sections VII.C.9 and X.A.2 of the Amended Consent Decree. The Quarterly Reports submitted by the Participating Companies shall include:

1. all data collected in the previous quarter pursuant to the GM&EP;

2. all data collected in the previous quarter pursuant to the Site-wide O&M Plan relevant to the MRTF, Area 7 Plant and Area 12 Plant; and

3. a brief summary of the status of the MRTF, Area 7 Plant and Area 12 Plant.

The Annual Site Monitoring Reports submitted by the Participating Companies shall

include data and other information collected and developed in accordance with the GM&EP.

The CMRs submitted by the City shall include all data collected in the previous quarter pursuant to the relevant sections of the CGTF O&M Plan. The schedule for submittal of the CMRs shall also be included in the CGTF O&M Plan.

EPA will review but will not approve or disapprove these reports.

I. Health and Safety Plan

To ensure protection of on-site personnel and area residents from hazards posed by sampling and/or O&M activities, Participating Companies shall also develop a Sitewide Health and Safety Plan (HASP), or update an existing HASP. The HASP shall be in conformance with U.S. Occupational, Safety, and Health Administration (OSHA) requirements as outlined in 29 C.F.R. §§1910 and 1926, as appropriate, and any other applicable requirements. The HASP shall describe health and safety risks, employee training, monitoring and personal protective equipment, medical monitoring, levels of protection, safe work practices and safeguards, contingency and emergency planning, and provisions for site control. EPA will review but will neither approve nor disapprove Participating Companies' Health and Safety Plan. This HASP shall be submitted in two phases and cover all sampling as well as O&M activities.

J. Certification of Completion of Remedial Action Report - Work Complete

After all phases of the Work (including O&M) under the Amended Consent Decree have been performed, a final round of inspections shall be conducted for the purpose of certifying that all work required by the Amended ROD and the Amended Consent Decree has been completed.

Participating Companies shall then submit a Certification of Completion of Remedial Action Report in accordance with Section XXXIX.A.1. of the Amended Consent Decree indicating that all work has been completed and demonstrating that the ground water in the UAU, MAU and LAU meets the Performance Standards set forth in Section XII.B.8 of the Amended ROD. The Certification of Completion of Remedial Action Report shall document completion of the entire remedy as outlined in the Amended ROD.

In the Report, a registered Professional Engineer and the Participating Companies' Project Coordinator shall state that the Work has been completed in full satisfaction of requirements of Sections VII. and VIII. of the Amended Consent Decree. The written report shall provide a synopsis of the work defined in this SOW, describe deviations from the RD/RA Work Plan, provide actual costs of the remedial action (and O&M), and provide a summary of the results of operational and performance monitoring completed. The report shall contain the following statement, signed by a responsible corporate official

of the Participating Companies or the Participating Companies' Project Coordinator:

"To the best of our knowledge, after thorough investigation, we certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The Participating Companies, SRP, and/or the City, may propose terminating the operation of one or more of the NIBW groundwater treatment facilities or extraction wells prior to EPA's issuance of a Certification of Completion of Remedial Action. Such a proposal must include a demonstration that such plant or well is no longer significantly contributing to the remedy and is not expected to be needed in the future for the successful completion of the remedy. EPA may allow for such termination if it finds that such activity is no longer necessary to meet the requirements of this Amended Consent Decree. Any such termination shall be in accordance with Section XX.D.2 of the Amended Consent Decree.

K. Consumer Confidence Reports

Participating Companies and the City shall submit copies of Consumer Confidence Reports prepared for the MRTF and the CGTF, respectively, in accordance with R-18-4-701 through 710 to EPA and the State. EPA will review but will not approve or disapprove these reports.

L. NIBW Technical Committee Meetings

The NIBW Technical Committee shall consist of technical representatives of the Participating Companies, SRP, the City, EPA and the State. The NIBW Technical Committee shall meet as necessary based on Site activity level. The meetings shall address project status, problems, solutions, and schedule. The Participating Companies shall prepare a meeting summary to document all decisions made, issues outstanding, schedule changes, planned follow-up, and action items.

V. Schedule for Major Deliverables and Other Tasks

ACTIVITY	DUE DATE[1]
Groundwater Monitoring and Evaluation Plan (GM&EP)	Draft GM&EP submitted on 6/20/02. Comments provided on 7/18/02 and 7/30/02. Revised draft submitted on 8/30/02.

ACTIVITY	DUE DATE[1]
Sampling and Analysis Plan (SAP) for activities required by the GM&EP - Phase I	No later than sixty (60) days after EPA approval of the GM&EP. EPA review time of thirty (30) days[2] Revised plan due thirty (30) days after receipt of EPA comments
Health and Safety Plan (HASP) for activities required by the GM&EP - Phase I	No later than forty five (45) days after EPA approval of the GM&EP EPA review time of thirty (30) days[2] Revised plan due thirty (30) days after receipt of EPA comments
Laboratory Specific Quality Assurance Plan[3]	If non-CLP laboratories are to be used for analysis of samples, then a laboratory-specific Quality Assurance Plan shall be submitted with the associated SAPs. Such plan must be approved by EPA prior to use of any non-CLP laboratory.
Initiate GM&EP sampling	No later than thirty (30) days after EPA approval of both the GM&EP and its associated SAP - assuming that the QAPP for the laboratory to be used has been approved by EPA.
Quarterly Reports (electronic)	Due Quarterly: May 30th, August 30th, November 30th, and February 28th of each year. This equates to sixty (60) days after the end of each calendar quarter (beginning January 1st). The first Quarterly Report will be due on whichever date above comes first after EPA approval of GM&EP. The last Quarterly Report for a year may be included in that year's NIBW Annual Site Monitoring Report.
NIBW Annual Site Monitoring Reports	Due annually on February 28th, for the previous calendar year. The first NIBW Annual Site Monitoring Report shall be due on February 28, 2003
Sitewide Operation and Maintenance Plan (Sitewide O&M Plan)	Draft due ninety (90) days after EPA approval of the CGTF O&M Plan. EPA review time of thirty (30) days[2] Revised report due thirty (30) days after receipt of EPA comments.
CGTF Operation and Maintenance Plan (CGTF O&M Plan)	Submitted by City of Scottsdale on 9/20/02. Currently under review by EPA and the State.
Compliance Monitoring Reports	Due Quarterly following EPA approval of CGTF O&M Plan.. The first report shall be due sixty (60) days after the completion of the first full quarter after CGTF O&M Plan approval.

ACTIVITY	DUE DATE[1]
Operation and Maintenance Manual(s) (O&M Manual)	Draft Manual(s) shall be developed in accordance with the EPA-approved schedule in the Sitewide O&M Plan. EPA may review the O&M Manuals at any time. If requested by EPA, revisions to the O&M Manual(s) are due thirty (30) days after receipt of EPA comments
RD/RA Work Plan	Draft due ninety (90) days after EPA approval of the Sitewide O&M Plan. EPA review time of sixty (60) days[2] Revised plan due thirty (30) days after receipt of EPA comments
Sampling and Analysis Plan (SAP)[7] - Phase II	Draft due forty-five (45) days after EPA approval of the Sitewide O&M Plan. EPA review time of thirty (30) days[2] Revised report due thirty (30) days after receipt of EPA comments.
Quality Assurance Reports	Due Annually. Submitted simultaneously with the NIBW Annual Site Monitoring Report.
Site Health and Safety Plan (HASP)[7] - Phase II	The Phase II HASP shall be submitted simultaneously with the RD/RA Work Plan either as a stand alone document, an appendix to the RD/RA Work Plan or an Addendum to the Phase I SAP. Review and revision schedule shall be identical to that of the RD/RA Work Plan.
Communication Plan	The Communication Plan shall be submitted simultaneously with the RD/RA Work Plan either as a stand alone document or an appendix to the RD/RA Work Plan. Review and revision schedule shall be identical to that of the RD/RA Work Plan.
Design Schedule	Remedial Design Schedule shall be submitted thirty (30) days after plant/extraction system modifications are deemed necessary by EPA. EPA review time of thirty (30) days[2] If necessary, revised schedule due 15 days after receipt of EPA comments
Conceptual/Preliminary Remedial Design Submittal[4]	Conceptual/Preliminary Remedial Design shall be submitted in accordance with the EPA-approved Design Schedule. EPA review time of thirty (30) days[2] If necessary, revised plan due 30 days after receipt of EPA comments

ACTIVITY	DUE DATE[1]
Intermediate Design Submittal[3]	The Intermediate Design submittal shall be submitted in accordance with the EPA-approved Design Schedule. EPA review time of thirty (30) days[2]
Final Design Submittal[3]	The Final Design submittal shall be submitted in accordance with the EPA-approved Design Schedule. EPA review time of thirty (30) days[2]
Construction Quality Assurance Plan, Construction Health and Safety Plan	Shall be submitted as a part of the Final Design
Notification of Selected Construction Contractor[5]	Thirty (30) days after EPA approval of Final Design
Pre-Construction Meeting and Construction Schedule Submittal[5]	Fourteen (14) days after Notification of Selected Construction Contractor
Initiate Construction[4]	Thirty (30) days after Pre-Construction Meeting and approved construction schedule
Pre-final Construction Inspection[6]	Initial inspections shall be conducted in accordance with EPA-approved schedule contained in the RD/RA Work Plan.
Pre-final Construction Inspection Report[6]	Fourteen (14) days after Pre-final Construction Inspection
Final Construction Inspection[6] (if needed)	Twenty-one (21) days after Pre-final Construction Inspection
Final Construction Inspection Report[6] (if needed)	Twenty one (21) days after Final Inspection
Interim Remedial Action Report	The Interim Remedial Action Report shall be submitted in accordance with the EPA-approved Design Schedule. EPA review time of thirty (30) days[2] If needed, revised report due 30 days after receipt of EPA comments.

ACTIVITY	DUE DATE[1]
Pre-Certification Inspection for Completion of the Work	Forty-five (45) days after Participating Companies conclude that all Work has been performed, including completion of all Operation and Maintenance activities
Certification Report Indicating that all Work has been Completed	Thirty (30) days after the Pre-Certification Inspection
Consumer Confidence Report	By July 1st of each year in accordance with R18-4-702.

1. Estimated time, in calendar days.
2. Failure to review a deliverable within the estimated time shall not constitute a violation of the Amended Consent Decree by the United States.
3. A Laboratory specific Quality Assurance Plan will be required if a Party chooses to use a non-CLP laboratory.
4. Design documents will only be required if deemed necessary by EPA.
5. Construction related activities will only be required if deemed necessary by EPA.
6. Construction inspections and inspection-related reports shall be required.
7. This SAP and HASP can be addenda to the SAP and HASP associated with the GM&EP or can be stand alone documents.

VI. Additional Requirements

The Participating Companies, the City and SRP shall prospectively comply with the following requirements:

A. Except as provided in Paragraphs B and C below, the Participating Companies, SRP, and the City shall submit to EPA, within sixty (60) days of the Effective Date of this Amended Consent Decree, hazardous waste determinations with respect to each solid waste generated by, used, or stored for their respective remediation activities at the Site. These determinations will be updated on an annual basis. Upon determination that a particular solid waste is a hazardous waste, the Participating Companies, the City and SRP will manage such waste accordingly, including the following:

1. Within sixty (60) days of the Effective Date of this Amended Consent Decree, the Participating Companies, the City and SRP shall submit a document that demonstrates the precautions that are being taken at each of the four facilities to prevent accidental ignition or reaction of ignitable or reactive waste, and prevent threats to human health and the environment from ignitable, reactive and incompatible waste. If no ignitable, reactive or incompatible wastes are being managed, the document shall so state. Thereafter, no ignitable, reactive, or incompatible waste shall be generated, used, or

stored without prior authorization of EPA.

2. Receipt of wastes from offsite for treatment at NIBW treatment facilities shall be prohibited.

3. Hazardous wastes shall not be left onsite, buried or managed in-place during or after decomissioning of the four NIBW groundwater treatment facilities.

4. With regard to use and management of containers containing hazardous waste, the Participating Companies, SRP, and the City shall comply with the following requirements:

   a. Containers must be maintained in good condition or replaced.

   b. Containers must be made of or lined with materials which will not react with, and are compatible with, the substances being stored in it.

   c. Containers must be kept closed, except when necessary to add or remove the substances.

   d. Containers must not be managed in a manner that will cause the container to rupture or leak.

   e. At least once a week, the Participating Companies, the City and SRP shall inspect areas where containers are kept to determine if containers are leaking or deteriorating.

   f. All container storage areas at the Site must have a containment storage system that meets the following standards:

      (1) a base must underly the storage area which is free of gaps or cracks and is capable of containing leaks and spills until the leak or spill is detected and fixed;

      (2) the base must be sloped or otherwise designed to drain, unless the containers are elevated or otherwise protected from spilled liquids;

      (3) the containment system must have sufficient capacity to contain 10% of the volume of containers or the volume of the largest container, whichever is greater;

      (4) run-on into the containment system must be prevented; and

      (5) spilled or leaked waste must be removed from the sump in as timely a manner as necessary to prevent overflow.

g. Containers holding ignitable or reactive hazardous waste must be located at least 50 feet from the facility property line.

h. Incompatible hazardous wastes shall not be placed in the same container.

i. At the time of any closure, all hazardous waste and waste residues must be removed from the containment system, and containers must be decontaminated or removed.

5. If a hazardous waste is identified at any time with an organic concentration of at least 10 ppmw, the air emissions standards for process vents set forth in 40 CFR Part 265 Subparts AA and BB shall apply, and the Participating Companies and the City, for their respective activities, shall propose a plan for compliance with these Subparts to EPA within thirty (30) days of such identification for review and approval, in consultation with the State. Upon approval, the Participating Companies and the City shall implement the plan.

6. Hazardous wastes generated on-Site may be accumulated for up to 90 days.

7. The Participating Companies, SRP and the City shall not place any hazardous waste in any salt dome formation, salt bed formation or underground mine or cave without prior authorization of EPA.

8. The Participating Companies, SRP and the City shall not place any hazardous waste in surface impoundments, waste piles, land treatment units, incinerators, or landfills without prior authorization of EPA.

B. The following materials will be managed as follows:

1. Spent carbon -- All spent carbon shall be sent to a licensed regeneration facility for recycling, regeneration, or reactivation. The spent carbon for air treatment at the Area 7, Area 12, CGTF, and MRTF facilities shall be profiled, including appropriate testing and/or analysis, at least once per year in accordance with the receiving facility policies. In the event that it is not necessary based on air monitoring to change out the granular activated carbon at a facility within a one year time frame, the carbon shall be profiled at the time of the next change out. The spent carbon shall be transferred from the vessels to proper shipping container(s) by qualified personnel using appropriate health and safety procedures and protocols. The spent carbon shall be transported to a facility permitted to accept the material. Documentation, including profiles, laboratory analytical reports, shipping manifests, and reactivation or regeneration certificates, shall be maintained by the Parties in accordance with the document maintenance procedures specified in the Amended Consent Decree. An alternative approach may be used if approved by EPA, after consultation with the State.

2. Spent acid wash water -- Spent acid wash water shall be neutralized before it is discharged to the sewer in accordance with the column cleaning procedure in the O&M Manual, including any applicable pre-treatment permit. An alternate approach may be used if approved by EPA in consultation with the State.

3. Certain other wastes -- The Participating Companies shall provide information, sampling data, or process knowledge sufficient to establish that the solid wastes listed below are not characteristically hazardous or otherwise are not subject to hazardous waste regulation. Upon such a showing, these wastes shall be managed as non-hazardous wastes. If the waste is characteristically hazardous, then it must be managed in accordance with Paragraph A above.

   a. Sediment removed from the bottom of treatment columns at any facility;

   b. Investigation-derived wastes; and

   c. Plastic air stripping packing media, column internal materials, and other treatment media.

4. Groundwater -- Groundwater at the site is not listed as a hazardous waste. The Parties shall not be required to make a hazardous waste determination with respect to groundwater, but groundwater extracted from NIBW wells as part of the remedy shall be managed as if it were hazardous waste. In order to comply with the requirement that groundwater be managed as if it were hazardous waste, the Parties shall comply with the following provisions:

   a. Untreated groundwater associated with normal operation, maintenance, and monitoring activities shall be managed as follows:

      (1) Facility sampling activities – Water collected during sampling at the MRTF, CGTF, Area 7 and Area 12 shall be returned to the inlet of the treatment system for treatment with the influent water or discharged to the sanitary sewer provided that concentrations are within allowable industrial discharge limits and such discharge is approved by the City.

      (2) Well equipment maintenance activities – Water resulting from well and well equipment maintenance shall be minimized to the extent possible. Measures shall be taken to restrict access to the well site location during well maintenance and to limit any water produced from the maintenance activities.

      (3) Untreated groundwater generated during purging and sampling of monitor wells shall be treated to MCLs in accordance with procedures

in the Phase I SAP using granular activated carbon prior to discharge.

b. Incidental or de minimis quantities of untreated water from the pipelines, wells, or associated equipment (such as water from the pipeline air release valves) shall not be subject to management requirements.

c. The RD/RA Work Plan shall include provisions to prevent the unauthorized entry of people or livestock into active portions of remediation at the CGTF, MRTF, Area 7 and Area 12 plants, and associated extraction and monitoring well sites.

d. The CGTF, MRTF, Area 7 and Area 12 facilities shall be inspected no later than sixty (60) days after the Effective Date of the Amended Consent Decree for malfunctions, deterioration, operator practices or errors and discharges that may be causing or could result in a release of untreated groundwater. A report of the inspection that identifies the nature of the inspection, any problems or hazards identified, and steps taken or to be taken to remedy those problems or hazards shall be included in the next submitted CMR for the CGTF and the next submitted Quarterly Report for the MRTF, Area 7 plant and/or Area 12 plant. Following the initial round of inspections, the Sitewide O&M Plan shall provide for annual inspections and documentation of those inspections. Two weeks notice shall be given to EPA and the State prior to conducting these inspections. EPA and the State may attend any inspection.

e. Within sixty (60) days of the Effective Date of this Amended Consent Decree, the Participating Companies, the City and SRP shall submit plans to EPA that describe the training to be conducted for personnel at each of their respective facilities and how to respond effectively to emergencies. The plan shall demonstrate that all personnel who supervise employees who are expected to come into contact with untreated groundwater in the normal course of their duties at any of the four existing treatment facilities, Site extraction wells, Site monitoring wells, and connecting pipelines will be trained in an appropriate manner to protect human health and the environment. Each plant operator and emergency coordinator shall be trained on health and safety protection consistent with OSHA 1910.120 requirements, and documentation of such training shall be provided to EPA.

Upon EPA approval, the training plan shall be implemented. The plan shall include, but not be limited to:

(1) a requirement for an annual training refresher course;

(2) the qualifications of the trainer; and

(3) a requirement that records regarding employee training be kept.

f. The Participating Companies, SRP and the City shall not place untreated groundwater in any salt dome formation, salt bed formation or underground mine or cave without prior authorization of EPA.

g. The Participating Companies, SRP and the City shall not place untreated groundwater in surface impoundments, waste piles, land treatment units, incinerators, or landfills without prior authorization of EPA.

h. Within sixty (60) days of the Effective Date of this Amended Consent Decree, the Participating Companies, the City and SRP shall submit documents to EPA, for review and approval in consultation with the State, that describe the contingency plans and emergency response plans to be implemented to respond to accidental releases of untreated groundwater from any of their respective Site treatment facilities and associated equipment, including pipelines and extraction wells. The plans shall provide that untreated water released to the environment will be managed as a hazardous waste if characteristically hazardous or if the volume of water poses a risk to human health or the environment. Otherwise, the water will be managed as a non-hazardous waste. Upon EPA approval, the plans shall be implemented. Once the plans are implemented, the Participating Companies, the City and SRP shall:

(1) Provide oral notification of the event that required implementation of the contingency plans and/or emergency response plans to EPA and the State within forty-eight (48) hours;

(2) Report to EPA and the State in writing within seven (7) days that the contingency plans and/or emergency response plans have been implemented; and

(3) If implementation of the plans is not effective, the plans shall be amended and resubmitted to EPA and the State within thirty (30) days for review and approval.

i. The Participating Companies will designate an emergency coordinator and will include the emergency coordinator designations of the City and SRP in the Site Wide O&M Plan and the emergency response plans. Each Party will notify EPA and the State in writing of any change in designations.

j. Within sixty (60) days of the Effective Date of this Amended Consent Decree, the Participating Companies, the City and SRP shall verify in writing that none of the existing NIBW treatment facilities, including wells and connective piping, is located within 200 feet of a fault (which has exhibited displacement

in Holocene time). Thereafter, the Participating Companies, the City and SRP shall not place any new facility, well, or pipeline within 200 feet of such a fault.

k. Within sixty (60) days of the Effective Date of this Amended Consent Decree, the Participating Companies, the City and SRP shall verify in writing that COS Well-75A, COS Well 72, PVWC-14 and the Granite Reef Well (SRP well 23.6E-6.ON) are the only existing parts of the remedy that are located within a 100-year flood plain. Measures for operating and maintaining these wells to prevent any washout by a 100-year flood shall be included in the Site Wide O&M Plan, or other appropriate document, which will be approved by EPA. If any new facilities or addition or modification to existing facilities are to be located, or if any existing facilities come to be located, within the 100-year flood plain, such facilities shall be designed, constructed, operated and maintained to prevent washout by a 100-year flood.

l. With regard to ultimate closure of the treatment facilities and extraction and monitoring wells, the Participating Companies, SRP, and the City must comply with the following requirements:

(1) A closure work plan and, if EPA determines it to be necessary at the time of closure, a post-closure work plan, shall be submitted to EPA and the State and approved by EPA prior to the decomissioning of any of the four NIBW groundwater treatment facilities. The plan shall include a description of decontamination of equipment prior to disposal or reuse of equipment, if necessary to ensure that the equipment is not characteristically hazardous.

(2) All wells targeted for abandonment must be abandoned in accordance with ADWR well abandonment requirements.

m. The Participating Companies, SRP, and the City shall provide documentation in the RD/RA Work Plan that leaks or spills of untreated groundwater will be contained at each of their respective NIBW treatment facilities and extraction well systems. The documentation shall include the following:

(1) An assessment of the integrity of any existing underground or aboveground tank at the CGTF, MRTF, Area 7 plant and Area 12 plant. If, as a result of the assessment, a tank is found to be leaking or unfit for use, the Participating Companies, the City and SRP shall remove that tank from service until is has been adequately repaired.

(2) An assessment of the containment capability of existing structures at the treatment facilities, including building walls, berms, and topographical features, in light of operational experience at the

facilities.

(3) An assessment by the Participating Companies through correlation of instrumentation and operating data provided by the plant operators, of the condition of underground pipes at the NIBW Site. If a leak is detected, the Participating Companies will assess the problem and propose measures to remedy the leak. Such measures shall be approved by EPA in consultation with the State.

Appropriate controls and practices must be used to prevent spills and overflows from the tank or containment systems. If the existing containment is not protective in the event of a leak, spill or other failure, the Participating Companies, the City and SRP shall implement in a timely fashion reasonable additional measures of containment, as approved by EPA in consultation with the State.

n. On January 1 of each year following the Effective Date of this Amended Consent Decree, the Participating Companies, the City and SRP shall provide a report to EPA that describes the creation and maintenance of records that document compliance with Section VI.4.a through VI.4.m of this SOW. Instead of submitting a separate report on January 1 of each year, this information may be included in the Annual Site Monitoring Report.

5. Additional Operating and Reporting Requirements

a. The Participating Companies, the City and SRP shall ensure proper operation and maintenance of their respective NIBW facilities consistent with the Sitewide O&M Plan and SAP, including effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls (including appropriate quality assurance procedures).

b. EPA and the State shall be permitted access to all NIBW facilities at reasonable times for inspection and copying of records.

c. The Participating Companies, the City and SRP shall give EPA and the State advance notice of any planned plant or well shut-downs.

d. The Participating Companies, the City and SRP shall report to EPA, the State and any other affected Party, any significant event at their respective facilities which may endanger health or the environment orally within 24 hours from the time they become aware of the circumstances, including:

(1) information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies; and

(2) any information of a release or discharge of hazardous waste or of a fire or explosion which could threaten the environment or human health outside any of the NIBW facilities.

VII. References

The following list, although not comprehensive, provides citations for many of the regulations and guidance documents that apply to the RD/RA process. Participating Companies shall review these guidance documents and shall use the information provided therein in performing the RD/RA and preparing all deliverables under this SOW.

"National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule," 40 C.F.R. Part 300

"Superfund Remedial Design/ Remedial Action Handbook," U.S. EPA, Office of Emergency and Remedial Response, June 1995 (EPA 540/R-95/059)

"Interim Final Guidance on Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties," U.S. EPA, Office of Emergency and Remedial Response, February 14, 1990, OSWER Directive No. 9355.5-01.

"EPA NEIC Policies and Procedures Manual," U.S. EPA, May 1978, revised May 1986.

"Guidance for the Data Quality Objectives Process" U.S. EPA, (EPA QA/G-4).

"EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations," May 1994, U.S. EPA, (EPA QA/R-5).

"Guidance for Quality Assurance Project Plans," February 1998, U.S. EPA, (EPA QA/G-5).

"Preparation of a USEPA Region 9 Field Sampling Plan for Private and State-Lead Superfund Projects," April 1990, U.S. EPA, (No. 9QA-06-89).

"Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (Draft), OSWER Directive No. 9283.1-2.

"Methods for Monitoring Pump-and-Treat Performance," U.S. EPA, Office of Research and Development, June 1994 (EPA 600/R-94/123).

APPENDIX B

RECORD OF DECISION AMENDMENT

for the

NORTH INDIAN BEND WASH SUPERFUND SITE
FINAL OPERABLE UNIT

SCOTTSDALE, ARIZONA

U.S. Environmental Protection Agency
Region IX
San Francisco, California

September 2001

North Indian Bend Wash
Record of Decision Amendment

Table of Contents

PART 1: THE DECLARATION

I. **Site Name and Location** - Indian Bend Wash Superfund Site, North Area, Maricopa County, Arizona. Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Identification Number AZD980695969.

II. **Statement of Basis and Purpose**

A. This decision document presents the United States Environmental Protection Agency's (EPA's) Selected Remedy for the Indian Bend Wash Superfund Site, North Area, Maricopa County, Arizona , which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on EPA's Administrative Record file.

B. The State of Arizona concurs with the Selected Remedy.

III. **Assessment of Site** - The response action selected in this Record of Decision Amendment (ROD Amendment) is necessary to protect the public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

IV. **Description of Selected Remedy** - This remedial action for the Indian Bend Wash Superfund Site, North Area (the Site or NIBW), addresses aquifer restoration by containment, treatment and monitoring of contaminated groundwater as well as soil remediation actions. Groundwater containment and treatment is accomplished using extraction well networks, air stripping and UV Oxidation technologies. Soil treatment is accomplished using soil vapor extraction technologies.

During the early stages of the cleanup actions at NIBW, the Site was divided into operable units (OUs). Although CERCLIS reflects numerous operable units for NIBW, there are actually only two: (1) the Groundwater OU; and (2) the Soils OU.

Due to the impact of contaminated groundwater on public drinking water supplies in the early 1980's, the initial focus of the site cleanup strategy was on containing and remediating the contaminated groundwater at the Site. This groundwater cleanup effort became the first operable unit or the Groundwater OU. Remediation of contaminated soil is the second operable unit or Soils OU. The focus of the Soils OU was to eliminate any remaining threats to groundwater due to residual soil contamination.

Following the construction and initial operation of the remedy selected in 1988 for the Groundwater OU, it became apparent that the groundwater contamination had not been contained as intended. Specifically, the groundwater plume was moving to the north and threatening the drinking water supply of the city of Paradise Valley. To prevent the contamination of Paradise Valley wells, additional actions were implemented to achieve capture of the groundwater contamination plume. These actions were completed on a voluntary basis

and have not been documented in a previous record of decision

The purpose of this ROD Amendment is to select a final Remedial Action for the Site and consolidate previous decisions regarding both groundwater and soil cleanup actions into one final document.

There are no known continuing source areas or Non-Aqueous Phase Liquids (NAPLs) present at NIBW and as a result principal threat waste was not considered for this Site.

The NIBW remedy includes the following requirements and actions:

A. Groundwater containment in the Middle and Lower Aquifers at NIBW to prevent further migration of the groundwater contamination plumes;
B. Localized focus on groundwater containment including contingency actions at Areas 7 and 12 to prevent migration of the contaminants in these specific areas from migrating to the southwest margin;
C. Restoration of the Upper, Middle and Lower Aquifers to drinking water quality by decreasing the concentrations of the contaminants of concern (*see* Section V.F., page 12) to below the cleanup standards (*see* Table 3, page 24);
D. Treatment of extracted groundwater using air stripping and UV oxidation technologies;
E. Groundwater monitoring in the Upper, Middle and Lower aquifers to verify and evaluate plume control, and overall effectiveness of the remedy;
F. Continued evaluation of remedy effectiveness based on periodic updates to the groundwater model; and
G. Completion of soil cleanup actions using soil vapor extraction which were required by an NIBW Record of Decision issued in 1991.

V. Statutory Determinations

A. The Selected Remedy attains the mandates of CERCLA Section 121 and to the extent practicable, the NCP. Specifically, the remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions to the maximum extent possible.
B. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).
C. Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining within NIBW above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain remedial action objectives and cleanup levels, a policy review shall be conducted within five years of construction completion for NIBW to ensure that the remedy is, or will be, protective of human health and the environment.

VI. ROD Data Certification Checklist - The following information is included in the Decision Summary Section of this ROD Amendment (Additional information can be found in the Administrative Record file for this site):

A. The Chemicals of Concern (COCs) are trichloroethylene (TCE), tetrachloroethylene

(PCE), 1,1-dichloroethene (1,1-DCE), trichloroethane (TCA), and chloroform (CFM). A discussion of the COCs can be found in Section V.F. page 12.

B. The cleanup standards for the COCs are the Maximum Contaminant Levels (MCLs) established in the Safe Drinking Water Act with the exception of chloroform. A list of the cleanup standards for the COCs can be found in Table 3, Section VII.E. page 24;

C. The risk assessment conducted for OU I concluded that the highest potential cancer risk would have been approximately 3.8×10^{-5} if water from contaminated supply wells within NIBW was served to individuals without treatment, see Section VII.A. page 21;

D. Principal threat wastes were not a factor in remedy selection, see Section XI. page 40;

E. Current and reasonable anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD are discussed in Section VI. page 18;

F. Potential groundwater use that will be available at the site as a result of the Selected Remedy is discussed in Section XII.D. page 48;

G. Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected can be found in Section XII.C. page 46; and

H. Key factors that led to selecting the remedy are identified in Section XII.A. page 42.

VII. Authorizing Signature

9-27-01
Date

Keith Takata
Keith Takata, Director
Superfund Division

PART 2: THE DECISION SUMMARY

I. Site Name, Location, and Description

This Record of Decision Amendment (ROD Amendment) addresses the North Indian Bend Wash Superfund Site (NIBW or the Site), which is located in Scottsdale, Arizona. The CERCLIS Identification Number for the Site is AZD980695969. The lead agency is the U. S. Environmental Protection Agency (EPA) and the support agency is the Arizona Department of Environmental Quality (ADEQ). The Site is being addressed as an enforcement-lead site and the expected source of cleanup monies is a settlement with Potentially Responsible Parties (PRPs).

The Site originally consisted of distinct isolated areas of soil contamination and groundwater contamination plumes. At this time, most of the soil contamination has been remediated. The groundwater is present in three separate levels or layers. These layers are referred to as the Upper, Middle, and Lower Aquifers. All three of these aquifers are contaminated.

The entire area of the Indian Bend Wash Superfund Site covers approximately 13 square miles in Scottsdale and Tempe, Arizona. The site was divided into two areas known as the Indian Bend Wash Area - North (NIBW - located in Scottsdale) and the Indian Bend Wash Area - South (SIBW - located in Tempe) (See Figure 1, page 5)[1]. This ROD Amendment focuses on NIBW only. More information on SIBW can be obtained at the information repository located at the Tempe Public Library, 3500 South Rural Road, Tempe, AZ 85282.

II. Site History and Enforcement Activities

There are numerous industrial facilities located in the NIBW area. Up until the 1970s, before our current environmental regulations existed, industrial solvents containing volatile organic compounds (VOCs) were typically disposed of directly onto the ground or in dry wells. These disposal practices, along with other releases, resulted in soil and groundwater contamination at NIBW.

Groundwater contamination at NIBW was discovered in 1981 when elevated levels of VOCs including trichloroethylene (TCE), tetrachloroethylene (PCE) and chloroform were found in several Scottsdale-area drinking water wells. As a result, local water providers stopped using those wells for drinking water. EPA and ADEQ have been involved in investigations and cleanup activities at NIBW since the initial discovery of VOCs in the groundwater in 1981. The entire Site, including both NIBW and SIBW, was placed on EPA's National Priorities List (NPL), or Superfund list, in 1983.

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[1] The boundaries shown on Figures 1 and 2 for NIBW and SIBW are not the legal boundaries of the sites. The boundaries identified on these figures depict the study areas for NIBW and SIBW. The actual boundaries of the NIBW site are based on the definition of "facility" in CERCLA Section 101(9).

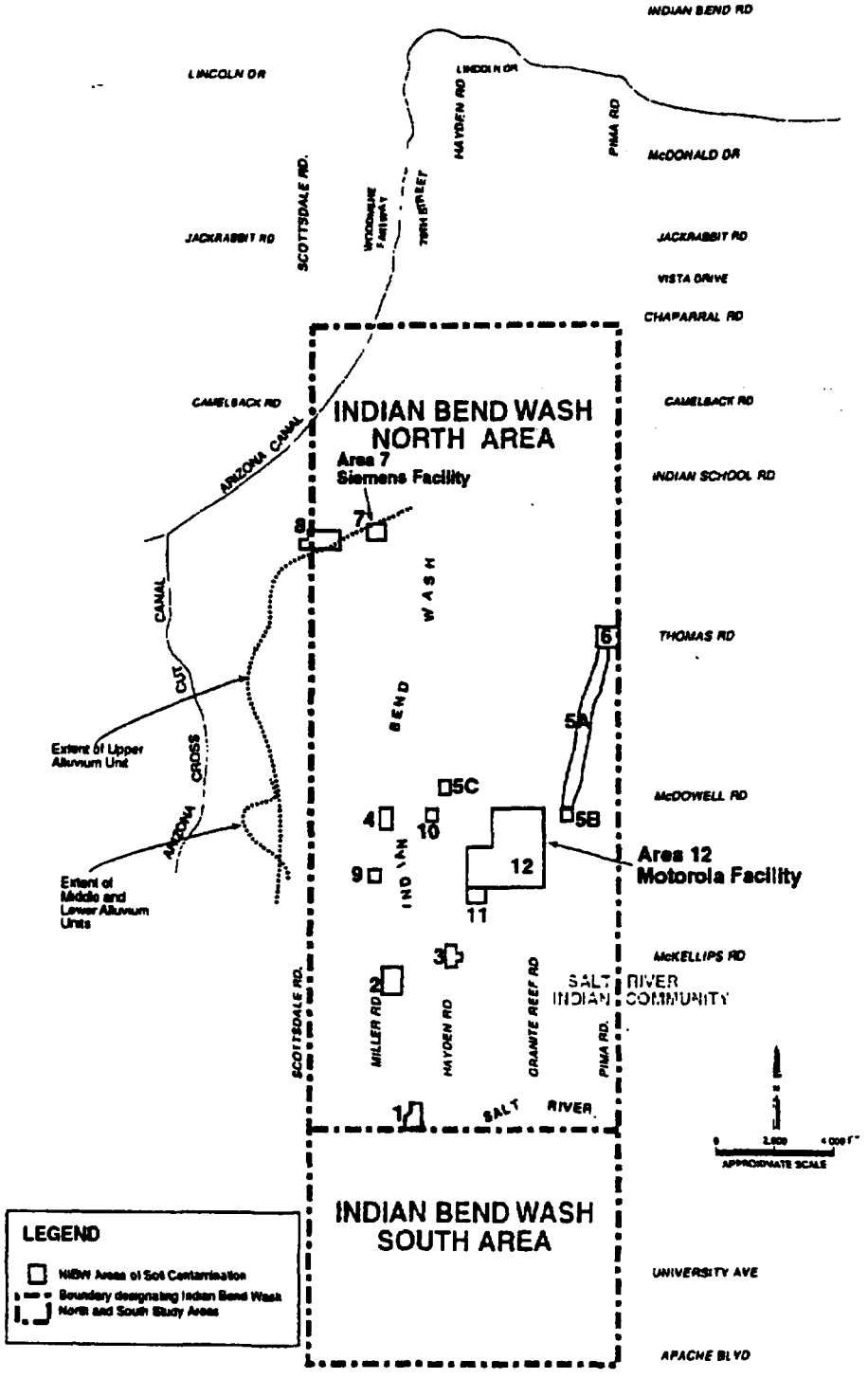
INDIAN BEND RD
LINCOLN DR
LINDEN DR
HAYDEN RD
PIMA RD
McDONALD DR
SCOTTSDALE RD.
JACKRABBIT RD
VISTA DRIVE
CHAPARRAL RD
CAMELBACK RD
ARIZONA CANAL
INDIAN BEND WASH
NORTH AREA
Area 7
Siemens Facility
INDIAN SCHOOL RD
THOMAS RD
CUT
CROSS
Extent of Upper Alluvium Unit
Extent of Middle and Lower Alluvium Units
McDOWELL RD
Area 12
Motorola Facility
McKELLIPS RD
MILLER RD
GRANITE REEF RD
SALT RIVER INDIAN COMMUNITY
SALT RIVER
INDIAN BEND WASH
SOUTH AREA
UNIVERSITY AVE
APACHE BLVD
LEGEND
IRBW Areas of Soil Contamination
Boundary designating Indian Bend Wash North and South Study Areas
APPROXIMATE SCALE

FIGURE 1

NIBW was investigated in two phases, typically referred to as Operable Units (OUs)[2]. For practical purposes, the groundwater contamination at NIBW is considered the first Operable Unit (OU I). OU I is also referred to as the Scottsdale Groundwater Operable Unit. OU II includes groundwater in the shallow aquifer and soil contamination in specific isolated areas.

The Remedial Investigation (RI) for OU I began in July 1984 and was completed in August 1986 This RI focused on characterizing the groundwater conditions as well as determining the extent of groundwater contamination. The Feasibility Study (FS) for OU I was completed in April 1988 and addressed only the Middle and Lower Aquifers at NIBW. On September 21, 1988 EPA, in consultation with ADEQ, issued a ROD for the Scottsdale Groundwater Operable Unit.

The RI and the FS for the second Operable unit, or OU II, were completed in April 1991 as a single document. The OU II RI/FS focused on the groundwater contamination in the Upper Aquifer and soil contamination at certain industrial facilities at NIBW. In total, 14 facilities or distinct areas were investigated. These areas are numbered 1 through 12. Area 5 consists of three different parts: 5A, 5B and 5C. Figure 1 on page 5 depicts the different areas investigated. EPA issued the OU II ROD in September 1991.

EPA has negotiated two Consent Decrees (CDs) with the potentially responsible parties (PRPs) at NIBW Although EPA investigated numerous PRPs, the parties that have continued to work cooperatively with EPA at the NIBW site are: Motorola Inc., Siemens Corporation, Smith-Kline Beecham Corporation, the Salt River Valley Water Users' Association, and the City of Scottsdale. In 1991, EPA completed negotiations for the first CD for implementation of the cleanup actions selected in the 1988 ROD. The main goals of this first ROD and CD were to make sure the groundwater contamination plume was not migrating beyond the site boundaries and to begin aquifer restoration.

In August 1993, EPA completed negotiations for a second CD with Motorola Inc., Siemens Corporation, the Salt River Valley Water Users' Association, the Salt River Project Agricultural Improvement & Power District, Smith-Kline Beecham Corporation, City of Scottsdale, L.D. Hancock & Elaine Hancock, the Highsmith Company, Microsemi Corporation – Scottsdale P.A.G.E. – Layher, and Scottsdale Memorial Hospital. This CD was for implementation of the cleanup actions selected in the 1991 ROD. The main goals of the OU II ROD and CD were to address soil contamination at specific facilities and monitor the groundwater in the Upper Aquifer.

Following the construction and initial operation of the remedy selected in 1988 for the Groundwater OU, it became apparent that the groundwater contamination had not been contained as intended. Specifically, the groundwater plume was moving to the north and

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[2] It should be noted that these OU designations are not equivalent to the OU designations in CERCLIS (or WASTELAN). The OUs in CERCLIS are numbered one to seven. OUs three and seven are for SIBW and not associated with NIBW. OU2 is actually the first OU or the Scottsdale Groundwater OU and the ROD for this OU was issued on September 21, 1988. OUs 1, 4, 5, and 6 all make up the second operable unit and the ROD issued on September 12, 1991 covers all of these OUs

threatening the drinking water supply of the city of Paradise Valley. To prevent the contamination of Paradise Valley wells, additional actions (which are discussed in detail in Section IX.C., pages 27-28) were implemented to achieve capture of the groundwater contamination plume. These actions were completed by the PRPs on a voluntary basis and have not been documented in a previous record of decision

In November 2000, the PRPs completed a feasibility study addendum (FSA) for NIBW which evaluated seven alternative approaches to improve the existing groundwater remediation systems. The FSA fulfills a requirement of the first Consent Decree for a supplemental study to evaluate the effectiveness of the overall groundwater remedy and methods to enhance its effectiveness.

III. Community Participation

The FSA Report and the third Proposed Plan for the NIBW Superfund Site in Scottsdale Arizona, were made available to the public in April 2001. These documents can be found in the Administrative Record file in the information repositories maintained at the EPA Region 9 Record Center at 75 Hawthorne Street in San Francisco and at the Scottsdale Civic Center Library at 3838 Civic Center Plaza, Scottsdale, Arizona. The notice of availability of the FSA, Proposed Plan, date and location for the public meeting and public comment period (April 30, 2001 through June 28, 2001) were published on April 30 in the Arizona Republic, the Scottsdale Tribune, and the Paradise Valley Independent newspapers. The public meeting was held May 9, 2001. The transcript of the public meeting is part of the Administrative Record and can be found in the information repositories identified above. EPA's response to comments received at the public meeting and written comments can be found in Part III of this ROD Amendment - the Responsiveness Summary. An overview of the proposed plan was presented by EPA at the public meeting and questions were addressed by a panel comprised of EPA, ADEQ, the Arizona Department of Water Resources (ADWR), Arizona Department of Health Services (ADHS), and the PRPs.

Beginning in mid-1996, EPA began conducting periodic meetings with small groups of citizens to provide updates on Site activities. The group of citizens became known as the NIBW Community Involvement Group (CIG). The CIG meetings were convened to provide interested community members from Scottsdale and neighboring areas with a forum to gather information on soil and groundwater cleanup strategies and gain detailed knowledge of Site activities over time. The CIG meetings have been an effective way to provide information to the community on a continuing basis and has been a valuable vehicle for the citizens to provide EPA and the PRPs with input regarding cleanup activities. The CIG meets informally and there are no specific requirements regarding the dynamic of the group or the frequency of meetings. CIG meetings are held on an "as needed" basis and are open to anyone interested in the Site.

IV. Scope and Role of the Operable Unit or Response Action

NIBW is a large complex site with groundwater contamination present in all three existing aquifers. In order to manage the Site in the most effective manner, EPA divided the Site into Operable Units. EPA anticipates that the remedial actions selected in this ROD Amendment will

be implemented by the PRPs. A description of the Operable Units or OUs is as follows:

A. OU I is the Scottsdale Groundwater OU. The ROD for OU I was issued in September 1988 and the PRPs implemented the work required by this ROD under the first CD. The goal of the OU I ROD was containment of the groundwater plumes and the OU I remedy failed to accomplish containment. As a result the PRPs worked cooperatively with EPA and the state agencies to implement additional actions in order to capture the plume. These actions became known as the Remedy Enhancements and are described in detail in Section IX.C., pages 27-28.

B. OU II included soils and groundwater in the Upper Aquifer. The ROD for OU II was issued in September 1991 and the PRPs implemented the work required by the OU II ROD under the second CD. The goal of the OU II ROD was to eliminate continuing groundwater contamination sources in the soil and to monitor the groundwater contamination in the Upper Aquifer.

C. This third ROD is technically an amendment to the OU I ROD. This ROD Amendment documents EPA's decision to select the actions previously required by the OU I ROD plus additional actions that are necessary to contain the groundwater contamination plume and restore the aquifer. This ROD Amendment is consistent with but does not alter the remedies selected in the OU II ROD. This ROD Amendment is anticipated to be the final decision document for NIBW. The goal of this ROD Amendment is an overall, comprehensive site cleanup strategy that will effectively remediate the contamination at NIBW over the long-term.

V. Site Characteristics

A. Conceptual Site Model

The Conceptual Site Model for the risk assessment and response action(s) were developed at the time that the 1988 and 1991 RODs were issued. The risk associated with ingestion of, inhalation of, or dermal contact with contaminants in groundwater was the driving factor for the OU I ROD. The OU II remedy was selected based on the threat posed by the potential for continuing contamination of the groundwater as a result of VOC contamination in soil. Direct contact exposure to VOCs in soil is not considered to be a significant threat. At this time, although much of the work required by the OU I and OU II RODs is complete, the Conceptual Site Model for potential risk and exposure remains the same. The final Remedial Action for NIBW will be based on reduction of risk due to the potential for exposure to contaminated groundwater. Exposure through the use of contaminated groundwater from private drinking water wells or public drinking water supplies could include ingestion of, inhalation of, and dermal contact with elevated levels of VOCs. Because the risk and the Conceptual Site Model remain the same, a new risk assessment was not conducted and the remedy selected in this ROD Amendment will be based on all of the Site data that has been generated to date and the risk assessments conducted for the OU I and OU II RODs.

Nearby surface water bodies include the Indian Bend Wash (the Wash), the Salt River, and the Salt River Project (SRP) canal system. In the early 1980's VOCs were detected in the Wash and determined to be a result of groundwater discharge into the ponds that make up the Wash. Groundwater discharge into these ponds was discontinued and subsequent sampling confirmed that VOCs were no longer present. Based upon the information currently available to EPA, the groundwater does not seep up to the surface or impact the Wash, the Salt River, or the canal system directly. Therefore, there are no known receptors for an ecological assessment.

B. Overview of Site

The NIBW Site encompasses approximately ten square miles. NIBW is located in the southern part of the Paradise Valley basin, which is in the east part of the Salt River Valley in Arizona. The Paradise Valley basin is bounded on the northeast by the McDowell Mountains, and on the west and southwest by the Phoenix Mountains, Camelback Mountain, and Papago Buttes. The original boundaries of the NIBW study area were designated as follows: Chaparral Road to the north, Pima Road to the east, Scottsdale Road to the west and the Salt River to the south. Since that time the groundwater contamination plume has migrated beyond the study area boundaries and therefore expanded the area of the Site. The most recent groundwater data indicates that the plume is as far north as Jackrabbit Road and in the southern portion of the site the plume has traveled west almost to 68th Street (*see* Figure 2 on page 10).

C. Surface and Subsurface Features

Land surface in the Paradise Valley basin generally slopes to the south where it merges with the floodplain of the Salt River. As indicated above, principal surface-water features in the vicinity of the Site include the Salt River, the Indian Bend Wash (the Wash), and the SRP canal system.

The Wash is the primary surface-water drainage feature for the Site. Flow into the Salt River from the Wash occurs infrequently in response to sustained precipitation events. Historically, the Wash was a natural desert wash emptying southward into the Salt River. During the 1970's, the U.S. Army Corps of Engineers, Maricopa County and the City of Scottsdale developed the Wash into a "green belt" within NIBW. It now consists of a series of linked ponds surrounded by irrigated recreational areas such as parks and golf courses. The Wash is lined with concrete south of the southernmost pond. During periods of flooding, the ponds in the Wash may overflow and discharge water to the Salt River. A second major wash in the area, the Granite Reef Wash, drains water along the eastern side of NIBW down to the Salt River.

The Salt River is located near the southern boundary of the Site. Releases from the Granite Reef Dam, located upstream from the Site, are principally responsible for flows in the Salt River. Discharges to the Salt River were generally small to absent during the period 1986 through 1991, but increased in 1992, 1993, and 1995.

The SRP canal system in the vicinity of NIBW consists of the Arizona Canal, the Arizona Cross Cut Canal, various smaller lined and unlined ditches, and pipeline

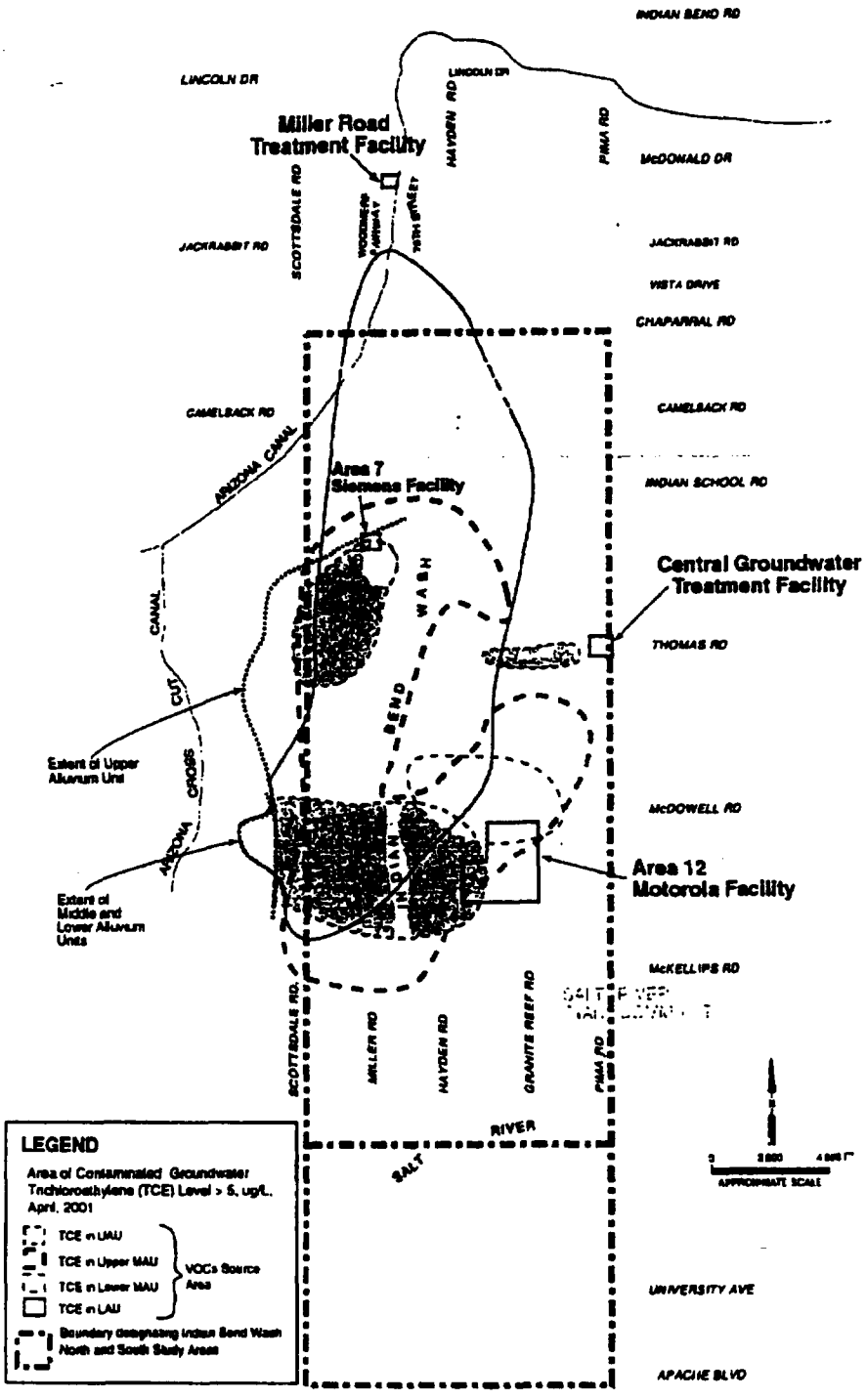

INDIAN BEND RD
LINCOLN DR
Miller Road
Treatment Facility
HAYDEN RD
PIMA RD
McDONALD DR
SCOTTSDALE RD
JACKRABBIT RD
VISTA DRIVE
CHAPARRAL RD
CAMELBACK RD
ARIZONA CANAL
Area 7
Siemens Facility
INDIAN SCHOOL RD
Central Groundwater
Treatment Facility
CUT
WASH
BEND
THOMAS RD
Extent of Upper
Alluvium Unit
ARIZONA CROSS
McDOWELL RD
Area 12
Motorola Facility
Extent of
Middle and
Lower Alluvium
Units
McKELLIPS RD
MILLER RD
HAYDEN RD
GRANITE REEF RD
PIMA RD
SALT RIVER
UNIVERSITY AVE
APACHE BLVD
LEGEND
Area of Contaminated Groundwater
Trichloroethylene (TCE) Level > 5, ug/L,
April, 2001
TCE in UAU
TCE in Upper MAU
TCE in Lower MAU
TCE in LAU
VOCs Source
Area
Boundary designating Indian Bend Wash
North and South Study Areas
APPROXIMATE SCALE

FIGURE 2

systems. This canal system is chiefly used to convey surface water from reservoirs located upstream along the Salt and Verde Rivers to downstream municipal and agricultural users in the Phoenix area. Groundwater is also pumped into the canal system from selected production wells, as necessary, based on availability of surface-water supplies and water demand. Although the two major canals in the area, the Arizona and Cross Cut Canals, are lined, some leakage from the canal system occurs.

D. Sampling Strategy

NIBW is located within the city limits of Scottsdale and has been fully developed with residences, commercial buildings and industrial structures. There are no known areas of archaeological or historical features at NIBW. Numerous groundwater monitoring wells and groundwater extraction wells are located throughout the Site. The Central Groundwater Treatment Facility (CGTF) is located at the corner of Thomas and Pima Roads and the Miller Road Treatment Facility is located on Miller Road and McDonald Drive. Groundwater extraction and treatment systems are also located at Area 7 (the Siemens facility) and Area 12 (the Motorola facility). There are also remnants of Soil Vapor Extraction (SVE) soil treatment systems located throughout the Site. However, EPA has approved the decomissioning of most of these SVE systems and many have been dismantled or are in the process of being dismantled.

Since the discovery of TCE in Scottsdale area wells in 1981, there have been numerous investigations conducted at NIBW (for a detailed description of these investigations please refer to Section 2.1.4 of the FSA, pages 2-5 to 2-30).

There are currently over 150 monitoring wells in the groundwater monitoring network at NIBW. Starting in 1983, monitoring wells were installed in the Upper, Middle, and Lower Aquifers in several different phases. This work was conducted by many different entities (e.g., EPA, Motorola, Siemens, etc.). The goal of the groundwater sampling strategy both in the present and in the past has been to determine the nature and extent of the contaminant plumes as well as to characterize the flow patterns of these groundwater formations.

Groundwater and soil sampling data were collected as part of the OU I and OU II remedial investigations. Both the OU I and OU II RODs required the installation and sampling of additional monitoring wells. All of the wells in the monitoring network are sampled every 6 months. This data will continue to be collected and compiled to help monitor the effectiveness of the groundwater remedy into the future.

The areas of soil contamination were fully characterized during the OU II remedial investigation. As a result, areas of soil contamination that were determined to be a threat to groundwater have been remediated (or are in the process of being remediated) using SVE, as required by the OU II ROD. No additional soil investigations are anticipated to be necessary.

E. Known and Suspected Sources of Groundwater Contamination

During the OU II remedial investigation EPA investigated areas of suspected soil

contamination throughout NIBW which had the potential to be sources of contamination to the groundwater. In total, 14 facilities or distinct areas were investigated. These areas are numbered 1 through 12. Area 5 consists of three different parts: 5A, 5B and 5C (*see* Figure 1 on page 5).

Soil contaminated with VOCs was detected in the immediate vicinity of most of the 14 potential source areas that were investigated. EPA determined that exposure to the contaminated soils did not pose a significant health threat. However, based on fate and transport modeling results it was concluded that the concentrations of contaminants in soil at some of the facilities were sufficiently high enough to cause further contamination of the groundwater. Therefore, soil cleanup was required as part of the OU II ROD at Areas 7, 8, and 12 to eliminate the threat to the groundwater. This soil cleanup work will be completed by the end of 2001 and there are no other known source areas remaining at NIBW.

F. Types of Contamination and Affected Media

As stated previously, the contaminants of concern (COCs) found in soil and groundwater at NIBW are volatile organic compounds or VOCs. Trichloroethylene (TCE) is the primary VOC of concern, although tetrachloroethylene (PCE), 1,1-dichloroethene (1,1-DCE), trichloroethane (TCA), and chloroform (CFM) have also been detected at lower concentrations. Heavy metals do not appear to be present at NIBW from other than natural sources. Table 1 below identifies the types and characteristics of the COCs.

Table 1: Types and Characteristics of Contaminants of Concern (COCs)

Contaminant/Abbreviation/ Category	Mobility	Carcinogenic	Non-Cancer Risks
Trichloroethylene/TCE/ VOC	High	yes	yes
Tetrachloroethene/PCE/ VOC	High	yes	yes
1,1-Dichloroethene/1,1-DCE/ VOC	High	yes	yes
Trichloroethane/TCA /VOC	High	no	yes
Chloroform/CHCl3/VOC	Very High	yes	yes

The affected media at NIBW had been both soil and groundwater. As discussed above, the soil contamination has been addressed as required by the OU II ROD. The media that continues to be a concern is the groundwater

G. Description of Aquifers, Sub-Surface Features, and Potential Routes of Migration

The NIBW study area is underlain by alluvial sediments which can be divided into four hydrostratigraphic units. These units consist of the Upper Aquifer (or Upper Alluvial Unit), the Middle Aquifer (or Middle Alluvial Unit), the Lower Aquifer (or Lower Alluvial Unit), and the Red Unit. Groundwater plumes contaminated with VOCs have

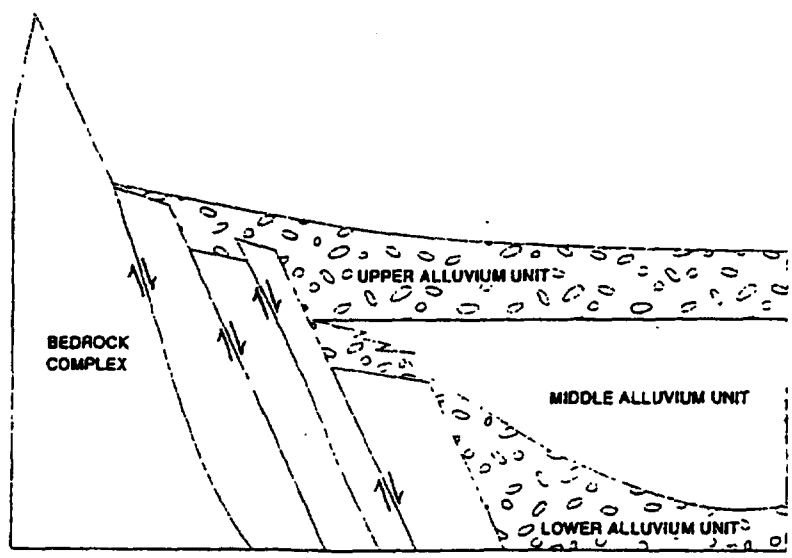
been characterized in the Upper, Middle, and Lower Aquifers at NIBW.

The Upper Aquifer varies in thickness: however, in the vicinity of the study area, the thickness of the Upper Aquifer is approximately 120 to 160 feet. The Upper Aquifer consists primarily of sand, course gravel, cobbles, and boulders in this area. Groundwater occurs at depths ranging from approximately 90 feet to approximately 130 feet below ground surface (bgs), with up to 40 feet of saturated thickness. The saturated thickness of the unit changes with time of year and generally decreases to the north.

The Middle Aquifer primarily consists of silt, clay, and interbedded fine sands. Relatively thin layers of coarser deposits are scattered throughout the unit. The thickness of the Middle Aquifer ranges from approximately 360 to 660 feet. Water levels in wells perforated in the middle aquifer occur at depths of 140 to 180 feet.

The Lower Aquifer consists of weakly to strongly cemented gravel, boulders, sand, sandy clay, silty sand, and interbedded clay. The portion of the Lower Aquifer penetrated by monitoring wells has generally coarser grained material than the Middle Aquifer. The thickness of the Lower Aquifer in the study area is not well known. Water levels measured in the Lower Aquifer are range from 166 to 212 feet bgs.

Water level data indicate that there is a downward-directed vertical hydraulic gradient between the Upper Aquifer and the Middle Aquifer and between the Middle Aquifer and the Lower Aquifer. Figure 3 below depicts the Upper, Middle, and Lower Aquifers.



Schematic Hydrogeologic Section

FIGURE 3

There is a deeper aquifer at NIBW known as the Red Unit. The Red Unit comprises a wide range of tertiary sediments with reddish-brown color and distinctive cementation. Groundwater is expected to flow through the Red Unit as a continuous porous medium with enhanced flow potential where it has been fractured and faulted. The Red Unit is expected to occur between the Lower Aquifer and the basement rocks, however, the Red Unit has not been fully characterized in NIBW investigations.

The areal extent of the contamination is currently located roughly between McKellips Road to the south and Jackrabbit Road to the north. The eastern edge of the plume extends close to Pima Road. The western edge of the plume is just beyond Scottsdale Road in the southern portion of the plume but does not cross Scottsdale Road in the northern portion of the plume (*see* Figure 2 on page 10).

The area known as the southwest margin warrants some additional discussion. The southwest margin is generally defined to be the area bounded to the east by Scottsdale Road, to the south by McKellips Road, to the north by McDowell Road, and to the west by the area where the alluvial sediments pinch out as they approach at Papago Buttes. The southwest margin is an integral component of the conceptual model of groundwater flow for the Site. Hydrogeologic conditions and the distribution of TCE along the southwest margin needed to be characterized to provide a basis for evaluating patterns of groundwater movement and contaminant occurrence that are important to the understanding of the Conceptual Site Model.

Groundwater in the Upper Aquifer generally moves from east to west across the Site toward the southwest margin. Upon reaching the southwest margin, groundwater in the Upper Aquifer moves downward and eastward in response to the downward hydraulic gradient. This vertical movement occurs from the Upper Aquifer either to the Lower Aquifer directly or through a thin layer of Middle Aquifer sediments. This movement results from the regional downward hydraulic gradient that is caused by large-scale historic deep groundwater extraction from Lower Aquifer production wells to the north. This downward vertical movement in the southwest margin is facilitated by the thinning and, in some areas, the absence of Middle Aquifer sediments west of Scottsdale Road.

During development of the FSA the PRPs developed a groundwater model with input from EPA and the state. The FSA Model is based on the Conceptual Site Model that includes and, by necessity, simplifies the geologic framework, Site hydrogeologic conditions, and the nature and extent of contamination. The FSA Model was designed to be consistent with the Site conceptual model and previous modeling efforts. The model was developed using the well-accepted modeling codes MODFLOW (McDonald and Harbaugh, 1988) for groundwater flow and MT3D^{96} (S.S. Papadopulos and Associates, Inc., 1996) for solute transport.

The FSA Model was designed to simulate the observed vertical and horizontal distributions of groundwater elevations and TCE concentrations. TCE was chosen as the solute to model because it is the primary VOC of interest for the Site and it generally represents the zones of VOC contamination at the Site. Detailed information on the groundwater model can be found in the FSA and the North Indian Bend Wash Feasibility

Study Addendum Groundwater Model Final Report. Both of these models can be found in the Administrative Record.

H. Location of Contamination

Areas of concern within the groundwater plumes at NIBW are generally identified based on concentrations of TCE above the federal Safe Drinking Water Act Maximum Contaminant Levels (MCL). MCLs are EPA's standards for drinking water quality. The MCLs for the COCs at NIBW are as follows: TCE - 5 micrograms per liter (ug/l), PCE - 5 ug/l, 1,1-DCE - 6 ug/l, 1,1,1-TCA - 200 ug/l, and Chloroform - 100 ug/l. The plumes at NIBW are defined as areas of groundwater contamination at concentrations of TCE greater than the MCL, or 5 ug/l.

The hydrogeology at NIBW is fairly complex and the location of the specific zones within each alluvial unit, or aquifer, warrants some further explanation. It is also important to note that the zones of water within each aquifer do not necessarily flow in the same direction. The descriptions below define each zone in terms of the extent of TCE contamination.

In the Upper Aquifer there are three distinct contamination plumes referred to as Zones A, B and C. Zone A is defined as the plume that extends southward from Areas 7 and 8 and the groundwater in this zone flows toward the south-southwest. Zone B is defined as the plume that extends west from Area 6 and the groundwater in this zone flows toward the west. Zone C is defined as the plume that extends west from Area 12 and the groundwater in this zone flows toward the west. Zones A, B, and C are depicted in Figure 4 on page 16.

The latest groundwater data, collected in April 2001, indicates that the highest concentration of TCE in Zone A is 54 ug/l, the highest concentration of TCE in Zone B is 23 ug/l, and the highest concentration of TCE in Zone C is 2.6 ug/l. In April 1998, the highest concentration of TCE in Zone A was 200 ug/l, the highest concentration of TCE in Zone B was 19 ug/l, and the highest concentration of TCE in Zone C was 62 ug/l.

In the Middle Aquifer there are five distinct groundwater contamination plumes referred to as Zones D, E, F, G1 and G2. Zones D, E and F are located in the upper portion of the Middle Aquifer and Zones G1 and G2 are located in the lower portion of the Middle Aquifer. Zone D is defined as the plume that extends south and east from Area 7. Groundwater flow direction in Zone D varies in accordance with pumping stresses and is primarily to the south and east. Zone E is defined as the plume that extends southwest and northeast from Area 12 and the groundwater flow direction in this zone is generally to the west but varies based on regional pumping of wells. Zone F is defined as the western extension of Zone E. The predominant groundwater flow direction in Zone F is vertical to the Lower Aquifer and varies based on regional pumping and Salt River flow events. Zones D, E, and F are depicted in Figure 5 on page 17. Zone G1 is defined as the plume that extends north and northwest from Area 12 and the groundwater in this zone flows generally to the west or northwest and varies based on regional pumping

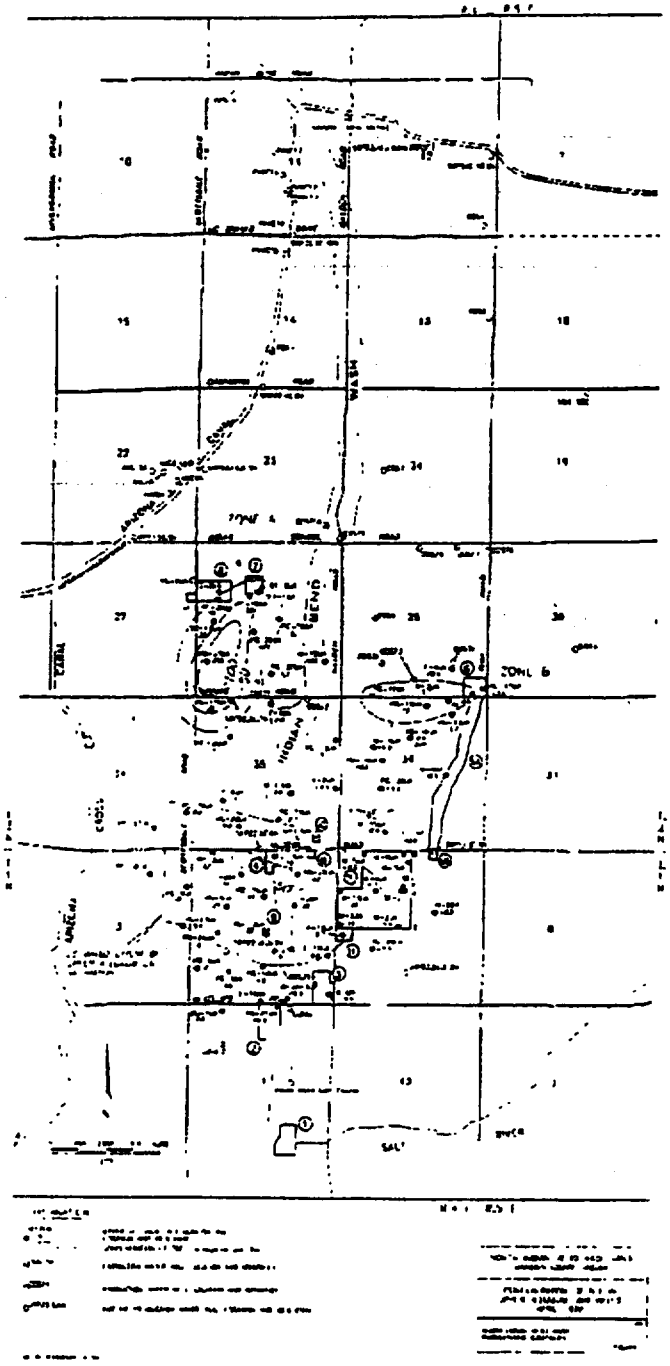


FIGURE 4

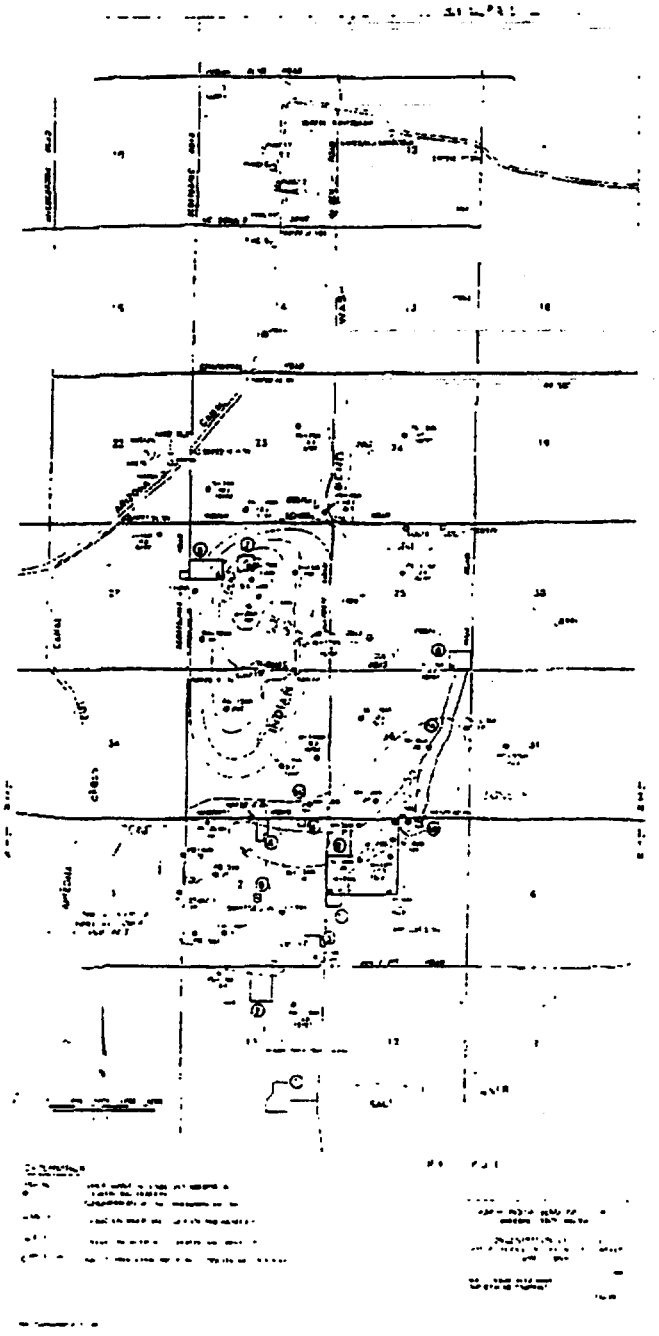


FIGURE 5

Zone G2 is defined as a narrow plume that extends south from the vicinity of the Hayden Road and Indian School Road intersection and the groundwater in this zone flows generally to the south. Zones G1 and G2 are depicted in Figure 6 on page 19. The highest concentrations of TCE in the Middle Aquifer as of April 2001 are as follows Zone D = 2,900 ug/l, Zone E = 5.5 ug/l, Zone F = 120 ug/l, Zone G1 = 100 ug/l, and Zone G2 = 5.1 ug/l. In April 1998, the highest concentration of TCE in Zone D was 3,200 ug/l, Zone E was 340 ug/l, Zone F was 77 ug/l, Zone G1 was 120 ug/l, and Zone G2 was 10 ug/l.

There is only one plume in the Lower Aquifer. This plume is divided into three zones of contamination (H, I, and J). Zone H is defined as the portion of the plume that extends from Indian School Road north to Jackrabbit Road. Zone I is defined as the portion of the plume extending from Indian School Road south to an east-west trending line approximately 200 feet south of Thomas Road. Zone J is defined as the portion of the plume that extends from an area about 1500 feet north of the intersection of Scottsdale and McKellips Roads north to Zone I. In general, the groundwater in the Lower Aquifer flows toward the north. Zones H, I, and J are depicted in Figure 7 on page 20. The highest concentrations of TCE in the Lower Aquifer as of April 2001 are as follows: Zone H = 260 ug/l, Zone I = 55 ug/l, and Zone J = 74 ug/l. In April 1998, The highest concentrations of TCE in the Lower Aquifer were as follows: Zone H was 150 ug/l, Zone I was 89 ug/l, and Zone J was 100 ug/l.

The data trends showing the groundwater plumes diminishing in size and decreasing contaminant concentrations can be attributed to the cleanup work that has either been completed or is in progress at NIBW. This ROD Amendment will finalize the groundwater cleanup remedy and ensure that the affected aquifers are restored to acceptable water quality standards.

VI. Current and Potential Future Land and Resources Uses

Land use in the NIBW area includes residential, industrial/commercial, agricultural, public and private recreational (parks, golf courses, playing fields, etc.), undeveloped open space, and waterways. Within the Site, approximately 90 percent of the land use is divided between residential (60 percent), industrial/commercial (17 percent), and recreational (13 percent). Areas surrounding the Site, particularly those east of the Site, include more agricultural land uses and undeveloped open space. Land use in the greater Paradise Valley basin is generally divided into 40 percent residential, 20 percent undeveloped open land, 15 percent agricultural, 12 percent recreational, 10 percent industrial/commercial, and 3 percent waterways. These land uses are not anticipated to change in the future.

Groundwater in the area is used as a drinking water source and for irrigation purposes. The groundwater that is extracted from within the plume is treated to drinking water standards before being served to the public Although long-term use of the groundwater as a drinking water source is expected to continue, it should be noted that there are some naturally occurring substances in the groundwater that could curtail its use in the future (*i.e.*, arsenic, nitrates, etc.). Area 7 groundwater is treated and then used to recharge the Upper Aquifer.

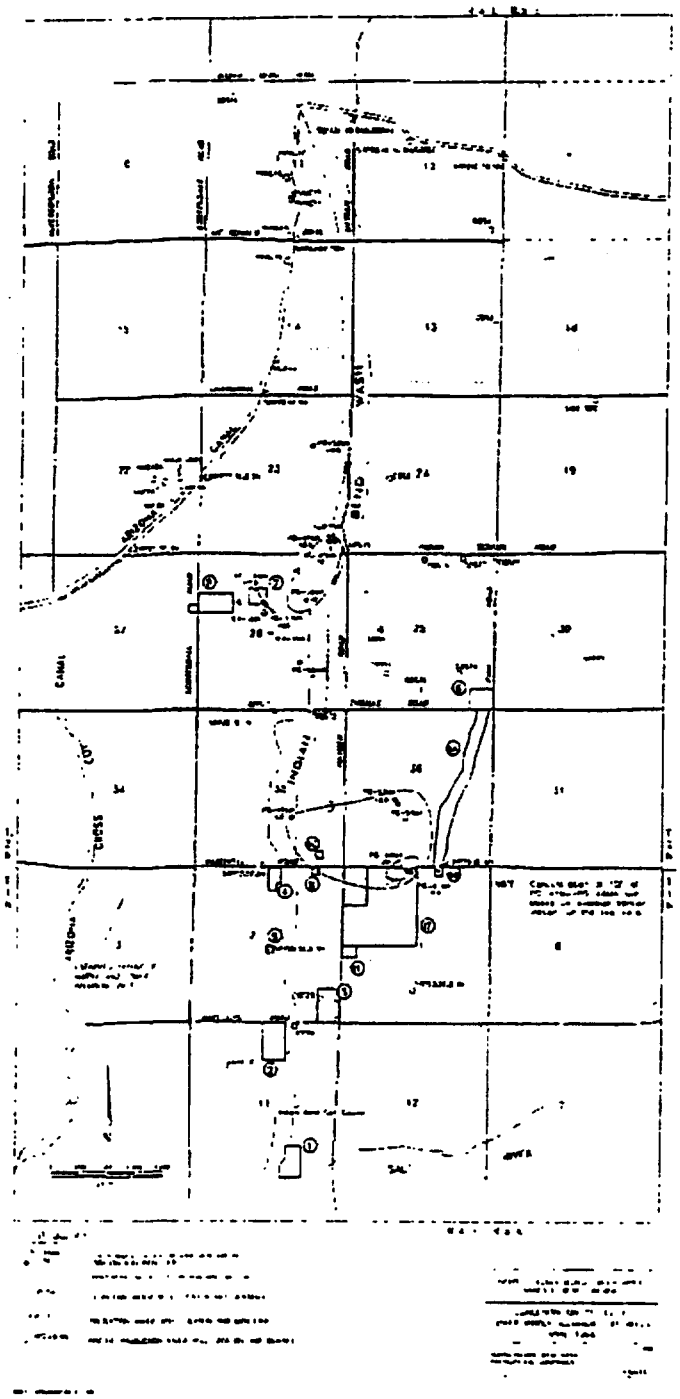


FIGURE 6

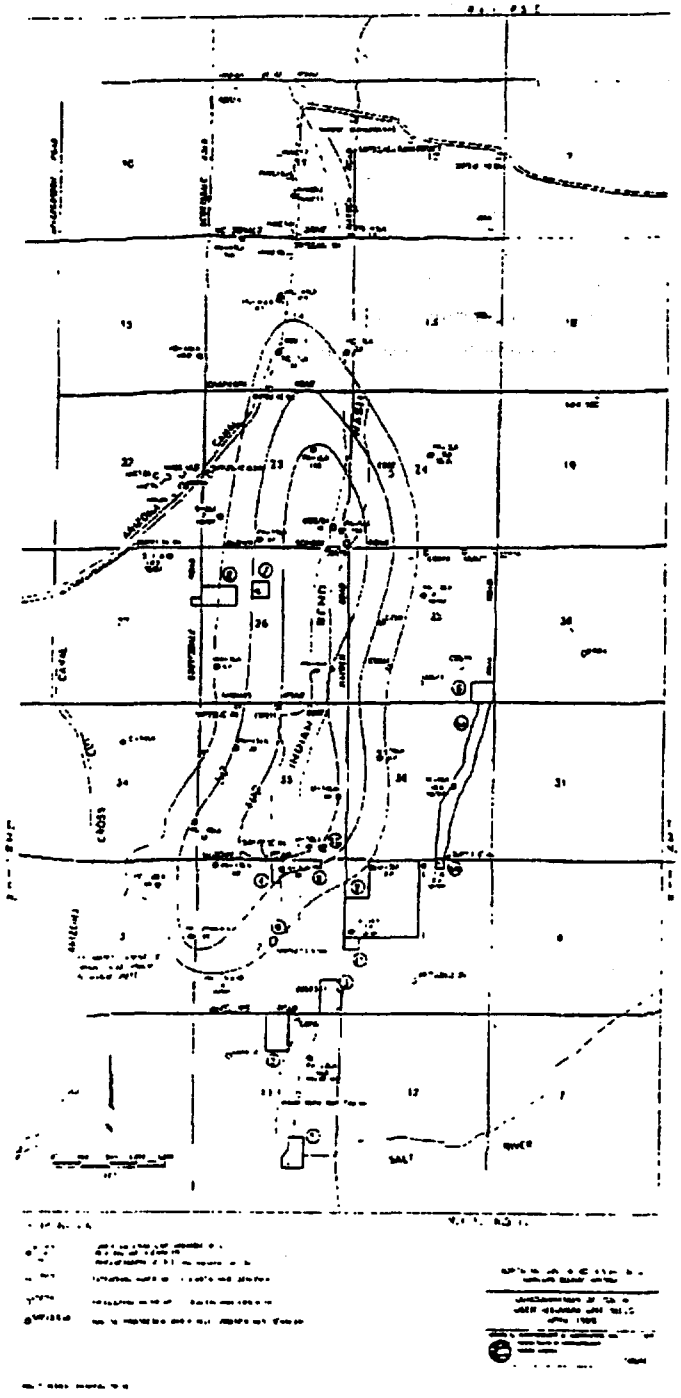


FIGURE 7

VII. Summary of Site Risks

As indicated above, the groundwater at NIBW is used as a drinking water source. There are no potentially significant completed exposure pathways for either human or ecological receptors. However, if anyone were to be exposed to present contamination levels in groundwater this exposure would pose a risk to individuals that exceeds EPA's acceptable cancer risk range. The response action selected in this ROD Amendment is necessary to ensure continued protection of public health, welfare and the environment from actual or threatened releases of hazardous substances into the environment.

It should be noted that because this document is a ROD Amendment, EPA guidance does not require the level of detail that would be contained in a ROD. However, since it has been quite some time since the first two RODs were issued for this site (1988 and 1991), EPA believes it is important to provide a summary of risk-related information in this ROD Amendment. This information is provided below. Since the focus of this ROD Amendment is groundwater, the majority of information on risk is based on the *Public Health Evaluation* which is included as part of the Operable Unit Feasibility Study for Remediation of Groundwater in the Southern Scottsdale Area (OUFS). This document is dated April 1988 and can be found in the Administrative Record for this site.

A. Summary of Human Health Risk Assessments

Risk assessments were performed for both OU I and OU II. The risk assessment conducted for OU I concluded that the highest potential cancer risk would have been approximately 3.8×10^{-5} if water from contaminated supply wells within NIBW was served to individuals without treatment. The risk assessment for OU II concluded that the greatest risk associated with contaminated soil was impact to groundwater. The other risk assessed was direct contact to contaminated soil which was found to pose only a minimal risk. Thus, soil cleanup actions were taken at specific areas of NIBW because it was determined that VOCs in the soil, if left unaddressed, would contribute to the groundwater contamination. At this time, the soil cleanup is nearly complete, eliminating the possibility of exposure to workers or residents to contaminants in soil as well as eliminating the future impact to groundwater.

The conclusions reached in the OU I and OU II risk assessments are still valid and a new risk assessment was not conducted for this ROD Amendment. Actual human exposure to the contaminants in groundwater at NIBW potentially occurred before the Scottsdale drinking water wells were found to be contaminated in 1981. Since those drinking supply wells were taken out of service, there has been no long-term human exposure to the contamination in the groundwater.

However, EPA's risk assessment policy requires evaluation of the *potential* risks associated with individuals drinking water from the contaminated aquifer for an extended period of time. Therefore, risk assessments evaluate the human health risks from hypothetical exposure to groundwater by future residential receptors if no action (e.g., treatment) were taken. Risk assessments provide the basis for taking action and identify the contaminants and exposure pathways that need to be addressed by the remedial action.

B. Identification of Contaminants of Concern - The COCs are all VOCs and are the same for both groundwater and soil. The COCs are identified in Table 1 on page 12.

C. Exposure Assessment

If groundwater contaminated with VOCs is used as a drinking water source, exposure to VOCs could occur via several pathways. These pathways include: (1) ingestion; (2) dermal contact while showering/washing; and (3) inhalation of volatiles. At the time the risk assessment was conducted, there were significant uncertainties associated with quantifying the inhalation and dermal contact exposure routes. Therefore, only ingestion was considered when calculating risks.

At the time the risk assessment was conducted, there was no significant human exposure to the contaminated groundwater at levels of concern. This remains the case today. The wells were taken out of service when the VOCs were discovered. However, worst case conditions were assessed which assumed that the City of Scottsdale (the City) would, under certain circumstances, be forced to use untreated contaminated water.

1. *Exposure Scenarios*

The City would not supply water for potable use that is known to contain VOCs in excess of drinking water standards. However, for the purposes of developing quantitative estimates of risks associated with the ingestion of water from the contaminated wells, hypothetical exposure scenarios were assumed. The following two exposure scenarios were evaluated:

a. It was assumed that untreated groundwater from the four inactive wells would be consumed for three months per year throughout an individual's 70-year lifetime; and
b. It was assumed that untreated water from the contaminated wells would be consumed for 12 months per year for 50 years.

2 *Exposure Levels* - Under both of these scenarios, maximum observed, concentrations were selected for risk characterization because of limitations in the data base of the contaminated wells. There was not an adequate amount of data to support averaging the sample results over time.

D. Toxicity Assessment - A toxicity assessment, similar to what would be conducted in risk assessments today, was not conducted in the *Public Health Evaluation* for NIBW. The *Public Health Evaluation* presented a summary of the toxicity of each of the COCs. This information was compiled based on information available at the time including: Health Effects Assessments and Health Advisories. Table 2 on page 23 identifies what was known as the "critical toxicity values" that were used for risk characterization at NIBW. These values include: Acceptable Chronic Intakes (ACI) for non-carcinogens and Carcinogenic Potency Factors for carcinogens. All values in Table 2 are based on ingestion (oral). There are values for inhalation, however, these values are not relevant to the risk characterization that was conducted for NIBW.

Table 2: Critical Toxicity Values		
Contaminant	Acceptable Chronic Intake - ACI (mg/kg/day)	Carcinogenic Potency Factor 1/(mg/kg/day)
Trichloroethylene	N/A[3]	1.1×10^{-2}
Tetrachloroethene	2×10^{-2}	5.1×10^{-2}
1,1-Dichloroethene	9×10^{-3}	N/A[4]
Trichloroethane	5.4×10^{-1}	N/A
Chloroform	1×10^{-2}	8.1×10^{-2}

E. Risk Characterization Assessment

The incremental cancer risks associated with each COC were summed to estimate the total risk for the mixture of chemical carcinogens in groundwater. As a result, the *Public Health Evaluation* for NIBW concluded the following. Under exposure scenario 1, the maximum cancer risk equaled 3.8×10^{-5} and under exposure scenario 2, the maximum cancer risk equaled 1.1×10^{-5}.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. The risks are probabilities that are expressed in scientific notation (e.g., 3.8×10^{-5} see above). An excess life time cancer risk of 3.8×10^{-5} indicates that 3.8 (or 4) individuals experiencing a specific exposure has a 4 in 100,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three.

The clean-up levels for the COCs for NIBW are listed in Table 3 on page 24. With the exception of chloroform, the cleanup levels are based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs). In the 1991 ROD, groundwater cleanup standards were established for the groundwater left in place. Specifically for chloroform, the selected cleanup standard was 6 ppb which was not the MCL and was based on a one-in-one million excess cancer risk level. Currently, the MCL that EPA uses for chloroform is 100 ppb. EPA believes it is appropriate to continue to use the cleanup standard that was established for chloroform in the 1991 ROD for the following

[3] Although TCE is a group B2 carcinogen (probable human carcinogen), there is no ACI value for TCE.

[4] 1,1-DCE is considered a Group C carcinogen or possible human carcinogen. There is no CPF value associated with 1,1-DCE.

reasons: (1) in most cases the treated groundwater at NIBW will be used for drinking water; (2) with the exception of one well, the levels of chloroform currently present in NIBW groundwater are below 6 $\mu g/l$; and (3) the chlorination processes used to disinfect drinking water have the potential to add chloroform to the water before it is distributed to customers.

Table 3: Cleanup Levels for Chemicals of Concern (COC)	
COC	Cleanup Level (MCL*)
Trichloroethylene	5 ppb
Tetrachloroethene	5 ppb
1,1-Dichloroethylene	6 ppb
1,1,1-Trichloroethane	200 ppb
Chloroform	6 ppb

* The cleanup levels in this table are MCLs with the exception of chloroform, as discussed above.

F. Summary of Ecological Risk Assessment - A review of potential ecological receptors concluded there were no significant completed pathways of significance. As described in Section V.A. on page 8, VOCs were detected in the Indian Bend Wash (the Wash) in the early 1980's. The presence of VOCs in the Wash was determined to be a result of groundwater discharge into the ponds that make up the Wash. Groundwater discharge into these ponds was discontinued and subsequent sampling confirmed that VOCs were no longer present. The groundwater does not seep up to the surface or impact the Wash directly. Therefore, there are no known receptors for an ecological assessment.

VIII. **Remedial Action Objectives:** The Remedial Action Objectives (RAOs) for NIBW are as follows:

A. Restore the Upper, Middle and Lower Aquifers to drinking water quality by decreasing the concentrations of the contaminants of concern (*see* Section V.F., page 12) to below the cleanup standards (*see* Table 3 on page 24);

B. Protect human health and the environment by eliminating exposure to contaminated groundwater;

C. Provide the City of Scottsdale with a water source that meets MCLs for NIBW contaminants of concern (VOCs);

D. Achieve containment of the groundwater contamination plume by preventing any further lateral migration of contaminants in groundwater;

E. Reuse of the water treated at the Site to the extent possible in accordance with Arizona's Groundwater Management Act;

F. Mitigate any soil contamination that continues to impact groundwater; and

G. Provide long-term management of contaminated groundwater to improve the regional aquifer's suitability for potable use.

These RAOs were selected based on the following considerations:

A. The need to restore the groundwater for drinking water use by decreasing VOCs to below MCLs because the groundwater at NIBW is used as a public water supply;
B. City of Scottsdale water supply wells were shut down and Paradise Valley public supply wells were threatened due to groundwater contamination from the NIBW Site;
C. Containment of contaminated groundwater at NIBW is necessary to protect existing public supply wells; and
D. The necessity for effective management of groundwater resources in the state of Arizona.

IX. **Description of Alternatives:** Seven alternatives were described and evaluated in the November 2000 FSA. During development of the Proposed Plan issued by EPA in April 2001, EPA identified an eighth alternative, Alternative 3A, which is a variation of Alternative 3 found in the FSA. The alternatives are identified below, detailed descriptions of the alternatives follow:

1. No action (also known as "the Required Remedy");
2. The Enhanced Remedy;
3. The Enhanced Remedy plus one new Middle Aquifer extraction well and one new recharge well;
3A. The Enhanced Remedy plus one new Middle Aquifer extraction well and one new recharge well, continued evaluation of groundwater conditions using the groundwater model and contingency actions for Area 7 and Area 12 groundwater plumes;
4. The Enhanced Remedy plus one new Middle Aquifer extraction well and one new Lower Aquifer extraction well;
5. The Enhanced Remedy plus one new Middle Aquifer extraction well and variable frequency drives;
5RR. Alternative 5 with reinjection/recharge.
6. The Enhanced Remedy plus three new Middle Aquifer extraction wells and three new Lower Aquifer extraction wells and a recharge well.

There has been a substantial amount of work completed at the NIBW Site to date. In order to adequately describe the alternatives evaluated in this ROD Amendment, a thorough description of actions previously completed is necessary.

A. <u>Actions Required by the OU I ROD, issued on September 21, 1988</u>

1. *Ground Water Monitoring Program - Installation and Operational Status*
   a. Between March and October of 1990, 23 new monitoring wells were installed including12 new Middle Aquifer wells and 11 new Lower Aquifer wells.
   b. Groundwater elevations and samples have been collected from the 23 wells installed in 1990, as well as from 34 previously existing monitoring wells and 7 previously existing production wells. The third of three required monitoring phases is ongoing.
   c. Pumping data from the 7 existing production wells at NIBW have been compiled and submitted to EPA since inception of the required groundwater monitoring program.

d. Data regarding releases and inflows into the Salt River between Granite Reef Dam and the mouth of the Wash have been compiled and submitted to EPA since inception of the required groundwater monitoring program.

2. *Ground Water Extraction System and Ground Water Treatment Plant - Construction and Operational Status*

a. Establishment and maintenance of a zone of capture within the Middle Aquifer and Lower Aquifer was required by the 1988 ROD. This zone of capture was to be accomplished by extracting groundwater at Wells COS31, COS71, COS72, and COS75[5]. The minimum rate of groundwater extraction was required to average 6,300 gallons per minute (gpm) over each calendar year. Pumping of these production wells began when the Central Groundwater Treatment Facility (CGTF) became operational in 1994. The location of the extraction wells and the CGTF (Scottsdale Treatment Plant) is depicted on Figure 8 below.

b. Construction of a facility to treat groundwater to meet drinking water MCLs for VOCs was required. The CGTF was constructed from September 1992 through January 1994. The CGTF has been operating since 1994 and will continue to operate until the NIBW groundwater cleanup objectives have been met.

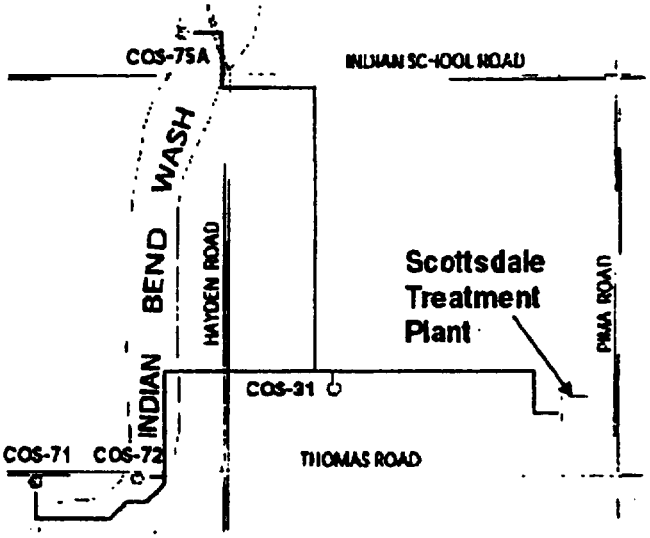


FIGURE 8

[5] These wells were City of Scottsdale wells that already existed at the time of the OU I ROD. These wells were rehabilitated in order to be used as extraction wells for the OU I remedy. Well 75 was subsequently replaced with well 75A.

B. Actions Required by the OU II ROD, issued on September 12, 1991

1. *Expanded Groundwater Monitoring Program for Upper Aquifer - Installation and Operational Status*
   a. Installation of additional monitoring wells to provide for a minimum of one Upper Aquifer monitoring well per 40 acres and a mechanism for monitoring vertical migration of Upper Aquifer groundwater to underlying units within specified areas of Upper Aquifer contamination. A total of 44 new monitoring wells were installed including: 37 Upper Aquifer, 4 Middle Aquifer, 1 Middle Aquifer/Lower Aquifer, and 2 Lower Aquifer monitoring wells in three specified areas of the Site during 1992 and 1993.
   b. Groundwater elevations and samples have been collected from the 44 new monitoring wells, as well as from 28 existing Upper Aquifer monitoring wells.
   c. VOC mass flux estimates have been prepared and provided to the agencies on a periodic basis.

2. *Vadose Zone (Soil) Remediation: Construction and Operational Status*
   a. Construction of a soil vapor extraction (SVE) system at Area 7 was completed in July 1994. SVE activities at Area 7 are expected to be complete by the end of the year (2001).
   b. Construction of an SVE system at Area 8 was completed in September 1995. SVE activities have been completed at Area 8 in accordance with the OU II ROD and the second Consent Decree (1993). This system has been dismantled.
   c. Additional investigations were conducted at Areas 3, 5, 6, 9, 11, and 12. Field investigation data and results of modeling indicated that in all Areas but Area 12, concentrations of VOCs in the vadose zone did not represent a threat to underlying groundwater. EPA did not require vadose zone remediation in Areas 3, 5, 6, 9, and 11.
   d. Construction of the SVE system at Area 12 was completed in September 1996. SVE activities have been completed at Area 12 in accordance with the OU II ROD and the second Consent Decree (1993). This system has been dismantled.

C. Remedy Enhancements

The actions required by both the 1988 and 1991 RODs came to be known as the "Required Remedy." These actions have all been completed or are ongoing (*e.g.*, groundwater monitoring program). Following the construction and initial operation of the Required Remedy, it became apparent that the groundwater contamination in the Middle and Lower Aquifers had not been contained as intended. Specifically, the groundwater plume in the Lower Aquifer was moving to the north and threatening the drinking water supply of the city of Paradise Valley. To prevent the contamination of Paradise Valley wells, the PRPs worked cooperatively with EPA and the State to identify and implement additional actions or "enhancements" that were necessary to achieve capture of the groundwater contamination plume. These actions were completed by the

PRPs on a voluntary basis and have not been documented in a previous record of decision. The enhancements are consistent with the nature and scope of the Required Remedy and have been implemented in coordination with EPA and the State. The Required Remedy together with these additional actions came to be known as the "Enhanced Remedy."

The following remedy enhancements have been completed:

1. Installation of 24 additional monitoring wells (2 in the Upper Aquifer, 1 in the Upper-Middle Aquifer; 16 in the Middle Aquifer, 1 in the Middle-Lower Aquifer, and 4 in the Lower Aquifer)
2. Installation of two new extraction wells to improve capture in the Lower Aquifer;
3. Connection of an additional extraction well to the CGTF;
4. Construction of a new treatment facility for wells in the north to protect the water supply of Paradise Valley. The new treatment facility is known as the Miller Road Treatment Facility (MRTF).
5. Implementation of a soil cleanup action at Area 6 using Soil Vapor Extraction;
6. Construction of groundwater extraction and treatment systems for the Middle Aquifer at Areas 7 and 12; and
7. Upgrades to CGTF columns to enhance performance and reliability of the treatment system.

The following work currently continues to occur as voluntary actions:

1. Continued extraction from wells PVWC-14, PVWC-15 and PCX-1 in the northern portion of the Site (Figure 9 on page 29 depicts the location of the MRTF and wells PVWC-14, PVWC-15 and PCX-1);
2. Continued extraction from Area 7 and 12 extraction wells;
3. Operation of the MRTF to treat the groundwater extracted from the northern part of NIBW;
4. Operation of the Area 7 and Area 12 groundwater treatment systems;
5. Increased frequency of groundwater sampling events and monitoring of the groundwater in the Upper, Middle, and Lower Aquifers; and
6. Collection of additional groundwater monitoring data.

D. Description of Remedy Components

Alternative 1 (no-action): Alternative 1 is the *Required Remedy* and includes all of the requirements of the 1988 and 1991 RODs. The basic components of this alternative include the following: (1) Extraction of the groundwater in the central portion of the Site; (2) Treatment of this extracted groundwater at the CGTF; (3) Treatment of soil using SVE at specific source area locations; and (3) Extensive groundwater monitoring. This Alternative does not contain the migration of the contaminated groundwater plumes, does not meet the Remedial Action Objectives (RAOs), is not protective of human health and the environment, and does not comply with ARARs. Therefore, it is not evaluated further.

d. Data regarding releases and inflows into the Salt River between Granite Reef Dam and the mouth of the Wash have been compiled and submitted to EPA since inception of the required groundwater monitoring program.

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b. Construction of a facility to treat groundwater to meet drinking water MCLs for VOCs was required. The CGTF was constructed from September 1992 through January 1994. The CGTF has been operating since 1994 and will continue to operate until the NIBW groundwater cleanup objectives have been met.

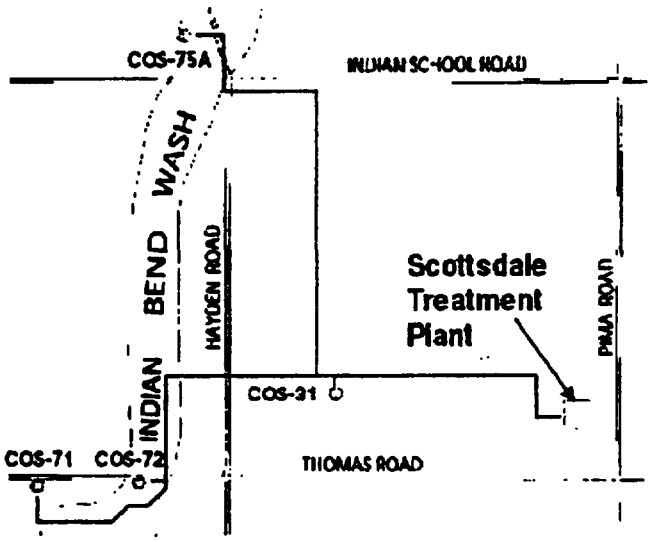

FIGURE 8

[5] These wells were City of Scottsdale wells that already existed at the time of the OU I ROD. These wells were rehabilitated in order to be used as extraction wells for the OU I remedy. Well 75 was subsequently replaced with well 75A.

B. Actions Required by the OU II ROD, issued on September 12, 1991

1. *Expanded Groundwater Monitoring Program for Upper Aquifer - Installation and Operational Status*
   a. Installation of additional monitoring wells to provide for a minimum of one Upper Aquifer monitoring well per 40 acres and a mechanism for monitoring vertical migration of Upper Aquifer groundwater to underlying units within specified areas of Upper Aquifer contamination. A total of 44 new monitoring wells were installed including: 37 Upper Aquifer, 4 Middle Aquifer, 1 Middle Aquifer/Lower Aquifer, and 2 Lower Aquifer monitoring wells in three specified areas of the Site during 1992 and 1993.
   b. Groundwater elevations and samples have been collected from the 44 new monitoring wells, as well as from 28 existing Upper Aquifer monitoring wells.
   c. VOC mass flux estimates have been prepared and provided to the agencies on a periodic basis.

2. *Vadose Zone (Soil) Remediation: Construction and Operational Status*
   a. Construction of a soil vapor extraction (SVE) system at Area 7 was completed in July 1994. SVE activities at Area 7 are expected to be complete by the end of the year (2001).
   b. Construction of an SVE system at Area 8 was completed in September 1995. SVE activities have been completed at Area 8 in accordance with the OU II ROD and the second Consent Decree (1993). This system has been dismantled.
   c. Additional investigations were conducted at Areas 3, 5, 6, 9, 11, and 12. Field investigation data and results of modeling indicated that in all Areas but Area 12, concentrations of VOCs in the vadose zone did not represent a threat to underlying groundwater. EPA did not require vadose zone remediation in Areas 3, 5, 6, 9, and 11.
   d. Construction of the SVE system at Area 12 was completed in September 1996. SVE activities have been completed at Area 12 in accordance with the OU II ROD and the second Consent Decree (1993). This system has been dismantled.

C. Remedy Enhancements

The actions required by both the 1988 and 1991 RODs came to be known as the "Required Remedy." These actions have all been completed or are ongoing (*e.g.*, groundwater monitoring program). Following the construction and initial operation of the Required Remedy, it became apparent that the groundwater contamination in the Middle and Lower Aquifers had not been contained as intended. Specifically, the groundwater plume in the Lower Aquifer was moving to the north and threatening the drinking water supply of the city of Paradise Valley. To prevent the contamination of Paradise Valley wells, the PRPs worked cooperatively with EPA and the State to identify and implement additional actions or "enhancements" that were necessary to achieve capture of the groundwater contamination plume. These actions were completed by the

PRPs on a voluntary basis and have not been documented in a previous record of decision. The enhancements are consistent with the nature and scope of the Required Remedy and have been implemented in coordination with EPA and the State. The Required Remedy together with these additional actions came to be known as the "Enhanced Remedy."

The following remedy enhancements have been completed:

1. Installation of 24 additional monitoring wells (2 in the Upper Aquifer, 1 in the Upper-Middle Aquifer; 16 in the Middle Aquifer, 1 in the Middle-Lower Aquifer, and 4 in the Lower Aquifer)
2. Installation of two new extraction wells to improve capture in the Lower Aquifer;
3. Connection of an additional extraction well to the CGTF;
4. Construction of a new treatment facility for wells in the north to protect the water supply of Paradise Valley. The new treatment facility is known as the Miller Road Treatment Facility (MRTF).
5. Implementation of a soil cleanup action at Area 6 using Soil Vapor Extraction;
6. Construction of groundwater extraction and treatment systems for the Middle Aquifer at Areas 7 and 12; and
7. Upgrades to CGTF columns to enhance performance and reliability of the treatment system.

The following work currently continues to occur as voluntary actions:

1. Continued extraction from wells PVWC-14, PVWC-15 and PCX-1 in the northern portion of the Site (Figure 9 on page 29 depicts the location of the MRTF and wells PVWC-14, PVWC-15 and PCX-1);
2. Continued extraction from Area 7 and 12 extraction wells;
3. Operation of the MRTF to treat the groundwater extracted from the northern part of NIBW;
4. Operation of the Area 7 and Area 12 groundwater treatment systems;
5. Increased frequency of groundwater sampling events and monitoring of the groundwater in the Upper, Middle, and Lower Aquifers; and
6. Collection of additional groundwater monitoring data.

D. Description of Remedy Components

Alternative 1 (no-action): Alternative 1 is the *Required Remedy* and includes all of the requirements of the 1988 and 1991 RODs. The basic components of this alternative include the following: (1) Extraction of the groundwater in the central portion of the Site; (2) Treatment of this extracted groundwater at the CGTF; (3) Treatment of soil using SVE at specific source area locations; and (3) Extensive groundwater monitoring. This Alternative does not contain the migration of the contaminated groundwater plumes, does not meet the Remedial Action Objectives (RAOs), is not protective of human health and the environment, and does not comply with ARARs. Therefore, it is not evaluated further.

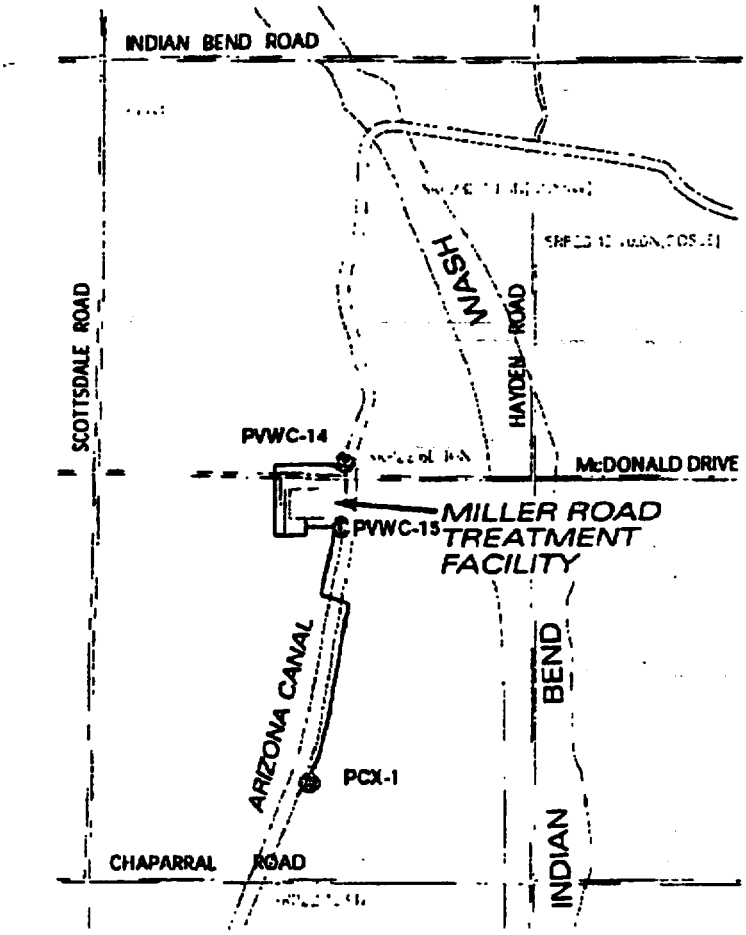

FIGURE 9

Alternative 2: Alternative 2 is the *Enhanced Remedy* and it includes all of the components of Alternative 1 plus the remedy enhancements described in Section IX.C., on pages 27-28. The basic components of this alternative include the following: (1) All components of Alternative 1; (2) Extraction of the groundwater in the northern portion of the Site; (3) Treatment of this extracted groundwater at the MRTF; and (4) Increased groundwater monitoring requirements. As described in Section IX.C., this alternative has been implemented voluntarily by the PRPs in cooperation with EPA and the State.

Alternative 3: Alternative 3 includes all of components of Alternative 2 plus the following:

1. Installation of one new extraction well (7EX-5MA) in the Middle Aquifer. This well will be located in the vicinity of Area 7. The extracted water will be treated at the existing Area 7 groundwater treatment plant;
2. Installation of one recharge well in the Upper Aquifer. This well will be located in the vicinity of Area 7. This new well and the other existing recharge wells near Area 7 accept the treated water from the Area 7 groundwater treatment plant;
3. Groundwater extraction from the Upper Aquifer at Area 7 may be terminated as performance objectives are achieved;
4. The Area 7 treatment plant will be upgraded in order to accommodate increased water production due to the new extraction well (7EX-5MA);
5. The minimum pumping rate for the wells connected to the CGTF (wells COS31, COS71, COS72, and COS75A) will be increased from the current rate of 6,300 gpm to 6,600 gpm. This is a combined annual average pumping rate;
6. A priority pumping scheme will be implemented which includes focused pumping from the most contaminated CGTF extraction wells (COS71 and COS75A); and
7. Spare pumping equipment will be purchased and utilized to maximize production and avoid long down-times at the two most contaminated CGTF wells (COS71 and COS75A).

Alternative 3A: Alternative 3A is a variation of Alternative 3 described in the FSA. For clarification purposes, this alternative is referred to as Alternative 3A. This alternative includes all actions identified for Alternative 3 with the following exceptions and additional actions:

1. With the exception of continued use of the MRTF and wells PCX-1, PVWC-14, and PVWC-15, the voluntary actions (identified in Section IX.C., pages 27-28) will become required actions under Alternative 3A;
2. The goal for minimum total annual average pumping rate will remain at 6,300 gallons per minute for the wells connected to the CGTF;
3. To ensure capture of the groundwater contamination plume, groundwater will be extracted from either wells PCX-1, PVWC-14, and PVWC-15 or wells that are equivalent in location, depth, design, capacity etc.
4. Maintenance of a minimum total annual average pumping rate of 5,480 gpm for wells PCX-1, PVWC-14, and PVWC-15 (or wells that are equivalent in location, depth, design, capacity etc.). This is a combined annual average pumping rate;
5. Treatment of extracted groundwater using air stripping at Area 12, the CGTF and the facility treating groundwater from PCX-1, PVWC-14, and PVWC-15 (or wells that are equivalent in location, depth, design, capacity etc.);
6. Treatment of extracted groundwater using UV-oxidation at Area 7;
7. Treated water and groundwater left in place shall not contain VOCs present above the cleanup standards (*see* Table 3 on page 24);
8. Periodic updating of the groundwater model to ensure that the extraction and treatment part of the cleanup strategy is working as predicted;

9. Localized containment of the groundwater plumes specific to Area 7 and Area 12; and
10. If groundwater data indicates that the Area 7 and Area 12 groundwater plumes are migrating toward the southwest margin, contingency actions, potentially including additional wells or increased pumpage in these areas, shall be evaluated and implemented.

Alternative 4: Alternative 4 is the Enhanced Remedy plus one new Middle Aquifer extraction well, one new Lower Aquifer extraction well, and one new Upper Aquifer recharge well. This alternative includes all actions identified for Alternative 2 plus installation of two new extraction wells and a recharge well. One of these wells will be installed in the vicinity of Area 7 and the extracted water from this well will be treated at the Area 7 groundwater treatment plant. The new recharge well will also be installed in the vicinity of Area 7. The other new well will be installed in the central part of the Lower Aquifer contamination plume and the extracted water from this well will be treated at the CGTF.

Alternative 5: Alternative 5 is the Enhanced Remedy plus one new Middle Aquifer extraction well, one new recharge well, and variable frequency drives. This alternative includes all actions identified for Alternative 2 in addition to the following:

1. Installation of one new extraction well and one new recharge well in the vicinity of Area 7;
2. Use of variable frequency drives to change extraction rates in response to water system demand; and
3. Use of large capacity pumps.

Alternative 5RR: Alternative 5RR is Alternative 5 with reinjection/recharge. This alternative includes all actions identified for Alternative 5 plus an evaluation of the possible effects of reinjection/recharge of the CGTF treated water. This alternative evaluated reinjecting groundwater into both the Upper and Lower Aquifers for control of the plume.

Alternative 6: Alternative 6 is the Enhanced Remedy plus three new Middle Aquifer extraction wells and three new Lower Aquifer extraction wells and a recharge well. This alternative includes all actions identified for Alternative 2 plus installation of six new extraction wells. Two of these wells will be installed in the Middle Aquifer in the vicinity of Area 7, and the extracted water from these wells would be treated at the Area 7 groundwater treatment plant. The new recharge well will be installed in the vicinity of Area 7. One of the other extraction wells would be installed in the Middle Aquifer in the vicinity of Area 12, and the extracted water from this well would be treated at the Area 12 groundwater treatment plant. The other three new extraction wells would be installed in the central part of the Lower Aquifer contamination plume, and the extracted water from one these wells would be treated at the CGTF. Water from the other two wells would be treated at alternate locations.

E. Common Elements and Distinguishing features of Each Alternative: The retained Alternatives (2, 3, 3A, 4, 5, 5RR, and 6) contain the following items:

1. Establishment and maintenance of a zone of capture within the Middle Aquifer and Lower Aquifer;
2. Treatment of all extracted groundwater to meet MCLs;
3. Use of the CGTF, the Area 7 Treatment Plant and the Area 12 treatment plant;
4. Groundwater monitoring in the Upper, Middle, and Lower Aquifers; and
5. Completion of SVE activities at Area 7.

Table 4 on page 33 summarizes unique elements of each of the alternatives. Table 5 on page 34 identifies the 50 year present worth cost of each of the alternatives; the cost to implement each of the alternatives, the number of new extraction wells per alternative, and the estimated percentage of mass removed from the groundwater after 50 years of remedy operation.

X. Summary of Comparative Analysis of Remedy Alternatives:

In accordance with the NCP, the alternatives are evaluated using the nine criteria. A summary of the comparative analysis of the alternatives can be found in Table 7 on page 39. For an alternative to be acceptable it must pass EPA's two threshold criteria: (1) Overall Protection of Human Health and the Environment; and (2) Compliance with Applicable, Relevant and Appropriate Requirements (ARARs). As described in Section IX.D. on page 28, Alternative 1 is not protective and does not comply with ARARs and is therefore not discussed in this section.

A. Overall Protection of Human Health and the Environment: All of the remaining alternatives (Alternatives 2, 3, 3A, 4, 5, 5RR and 6) are protective of human health and the environment and eliminate, reduce, or control risks posed by the contamination at NIBW through treatment.

Due to the failure of the remedy selected in the 1988 ROD to contain the plume, voluntary actions (described in Section IX.C., Remedy Enhancements, on pages 27-28) were taken to ensure protection of human health and the environment. Alternative 3A makes these voluntary actions required. The remaining alternatives indicate that the Remedy Enhancements would continue to be implemented on a voluntary basis. Therefore, such actions could potentially be discontinued at any time. By requiring continued implementation of the voluntary actions under Alternative 3A, EPA is ensuring that the remedies currently in place will continue to operate. This makes Alternative 3A more protective than the other alternatives.

B. Compliance with ARARs: All the remaining alternatives (Alternatives 2, 3, 3A, 4, 5, 5RR and 6) would comply with ARARs.

Table 4 - Summary of Unique Elements of Alternatives	
Alternative	Elements
2	• Alternative 2 has no unique elements. All of the other retained alternatives include all of the components of Alternative 2.
3	• An increase in minimum pumping rate goal for the CGTF wells from 6,300 gpm to 6,600 gpm
3A	• Past voluntary actions become required actions.[6] • Optional use of MRTF and wells PVWC-14, PVWC-15 and PCX-1. • Minimum pumping requirement for wells PVWC-14, PVWC-15 and PCX-1 (or equivalent wells). • Updated input to groundwater model. • Localized containment at Areas 7 and 12 including contingency actions.
4	• The installation of one new Lower Aquifer extraction well in the central part of the Lower Aquifer contamination plume.
5	• Use of variable frequency drives to change extraction rates in response to water system demand. • Use of large capacity pumps.
5RR	• Use of variable frequency drives to change extraction rates in response to water system demand. • Use of large capacity pumps. • Evaluation of reinjecting groundwater into both the Upper and Lower Aquifers for plume control.
6	• The installation of two new Middle Aquifer extraction wells and three new Lower Aquifer extraction wells.

[6] Although the descriptions of Alternatives 2 and 3 in the FSA appear to require the previously voluntary actions, this is not explicitly clear. In Appendix M1 (pages M1-2 and M1-3), under the descriptions of Alternatives 2 and 3 the following statement is made: "In addition, voluntary enhancements to all components of the required remedy would be implemented." This statement implies that although the voluntary enhancements would be implemented, they would be implemented on a voluntary basis. Therefore, it is important to make the distinction that under Alternative 3A, the voluntary actions are no longer "voluntary" but are required in accordance with this ROD Amendment.

Table 5 - Summary of General Comparison Information for Each Alternative				
Alternative	50 yr. Present Worth Cost in	Cost to Implement and/or Operate	Number of New Extraction Wells	Estimated Mass of TCE Removed after 50 Years
2	$128,196,600	$61,250,820**	0	93%
3	$132,775,800	$62,738,710	1	95%
3A*	$132,775,800	$62,738,710	1	95%
4	$134,215,000	$64,356,695	2	95%
5	$135,217,000	$65,304,605	1	96%
5RR	$146,700,000	$77,958,160	1	96%
6	$171,100,000	$100,842,869	6	96%

* Alternatives 3 and 3A are anticipated to be the same regarding these factors.

** These cost figures represent just operations costs - all construction costs have been incurred.

*** The costs for Alternative 3A will increase if a new treatment plant needs to be built to replace the MRTF and if new wells need to be drilled to replace PVWC-14, PVWC-15, and PCX-1.

TABLE 6: COST COMPARISONS					
	FSA cost estimate	Cost incurred to date capital + O&M:	50 years present worth cost	Cost to implement and/or operate	Difference between cost to implement & cost of existing remedies
Alternative 2	$128,196,600	$64,610,400	$125,861,220	$61,250,820*	$ 0
Alternative 3/3A	$132,775,800	$ 65,953,700	$128,692,410	$62,738,710	$4,174,490
Alternative 4	$134,215,000	$ 65,953,700	$130,310,395	$64,356,695	$4,449,175
Alternative 5	$135,217,000	$ 65,953,700	$131,258,305	$65,304,605	$6,740,385
Alternative 5RR	$146,700,000	$ 65,953,700	$143,911,860	$77,958,160	$19,393,940
Alternative 6	$171,100,000	$ 65,953,700	$166,796,569	$100,842,869	$42,278,649

* These costs figures represent just operations costs - all construction costs have been incurred.

The provisions of 40 C.F.R. Part 270 of the Resource Conservation and Recovery Act (RCRA) are applicable ARARs for the response actions selected in this ROD.[7] Once it is extracted for treatment, groundwater contaminated with hazardous substances is classified as hazardous waste, and must be managed accordingly. Once the extracted groundwater is treated to MCLs, the groundwater is no longer classified as a hazardous waste.[8,9]

A complete list of ARARs for the response actions identified in this ROD Amendment have been identified in Attachment 1.

C. Long-term Effectiveness and Permanence: All of the retained alternatives (Alternatives 2, 3, 3A, 4, 5, 5RR and 6) would permanently remove known chemicals of concern from the groundwater.

However, some alternatives provide better long-term effectiveness than others. All of the retained alternatives would permanently remove VOCs from the groundwater and would ultimately achieve the RAOs.. Operation and maintenance of the extraction and treatment systems for Alternatives 2 through 6 is designed to restore groundwater to drinking water quality by removing VOCs. Completion of the SVE soil remediation actions for Alternatives 2 through 6 is designed to eliminate additional threats to groundwater quality. Once these cleanup actions are complete, the contaminants will have been removed from soil and groundwater making these alternatives effective over the long-term and permanent.

During the cleanup process, groundwater monitoring programs for Alternatives 2, 3, 3A, 4, 5, 5RR and 6 would help EPA evaluate the effectiveness these alternatives. In addition to groundwater monitoring, Alternative 3A will require periodic input of newly collected groundwater data into the existing groundwater model. This will allow for a more thorough analysis of the effectiveness of 3A.

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[7] See U.S. EPA, CERCLA Compliance with Other laws Manual: Interim Final, at 2-4 to 2-7 (EPA 540/G-89/006) (August 1988). The determination that contaminated groundwater, once it is extracted for treatment, must be managed as a state and federal hazardous waste is based on site specific information contained in the Administrative Record. EPA finds that groundwater which is extracted from the site for management and treatment in accordance with this ROD is classified as hazardous waste because the groundwater:

- may contain levels of hazardous substances that meet or exceed state and federal hazardous waste toxicity criteria for specific hazardous wastes (40 C.F.R. Section 261.24); and
- will contain the following RCRA listed hazardous wastes: F001, F002, F003 and D001 (this list is not all inclusive).

[8] See Memorandum "RCRA Regulatory Status of Contaminated Groundwater" from Marcia E. Williams, Director Office of Solid Waste, U.S. EPA, to Patrick Tobin, Director Waste Management Division, U.S. EPA Region IV (dated November 13, 1986).

[9] See Memorandum "Status of Contaminated Groundwater and Limitations on Disposal and Reuse" from Sylvia Lowrance, Director Office of Solid Waste, U.S. EPA, to Jeff Zelikson, Director Toxics and Waste Management Division, U.S. EPA Region IX (dated January 24, 1989).

All of the alternatives include a certain amount of groundwater recharge (into the upper aquifer at Area 7). Because of this it is possible that incomplete treatment could result in reinjection of contaminated water into the aquifers. Since reinjection is contemplated on a much greater scale for Alternative 5RR, the risk is greater for this alternative.

Residual risk may be a factor in the length of time to achieve cleanup levels. It is estimated that MCLs will be achieved in all site monitoring wells in the early 2040's for Alternative 6. Within the timeframe contemplated by the groundwater model (before 2050), MCLs are anticipated to be achieved in all but approximately ten monitoring wells for the other retained alternatives. However, Alternatives 2, 3, 3A, 4, 5, 5RR and 6 all have the ability to maintain reliable protection of human health and the environment over the long-term.

D. Reduction of Toxicity, Mobility, or Volume Through Treatment: Over time, all of the retained alternatives at NIBW are projected to permanently reduce the toxicity, mobility, and volume of TCE mass through treatment. Despite significant differences in the location and intensity of groundwater extraction activities Alternatives 2, 3, 3A, 4, 5, 5RR and 6 all perform similarly over the long term. However, there are slight variations which are discussed below.

In approximately 50 years, Alternative 2 is projected to remove 93 percent of the TCE mass, Alternatives 3, 3A[10], and 4 are all projected to remove 95 percent of the TCE mass, and Alternatives 5, 5RR, and 6 are all projected to remove 96 percent of the TCE mass.

The area of the plume in the Upper Aquifer is currently estimated at approximately 1.3 square miles. Alternatives 2, 3, 3A, 4, 5, 5RR and 6 are all expected to take approximately 30 years to reduce the area of the plume in the Upper Aquifer to zero.

The area of the plume in the Middle Aquifer is currently estimated at approximately 3.1 square miles. The following plume area projections are based on a full fifty years of remedy operation. The area of the plume in the Middle Aquifer is projected to be 1.1 square miles for Alternatives 2 and 4. For Alternatives 3, 3A, 5, and 5RR the area of the plume in the Middle Aquifer is projected to be 1.0 square miles. For Alternative 6 the area of the plume in the Middle Aquifer is projected to be 0.8 square miles.

The area of the plume in the Lower Aquifer is currently estimated at approximately 4.5 square miles. After a full fifty years of remedy operation the area of the plume in the Lower Aquifer is projected to be 0.2 square miles for Alternative 2 and 0.1 square miles for Alternatives 3 and 3A. The area of the plume in the Lower Aquifer is expected to be zero in approximately 2048 for Alternatives 4 and 5, in 2040 for Alternative 5RR and in 2037 for Alternative 6.

E. Short-term Effectiveness: None of the alternatives considered are truly short-term remedies. All of the alternatives in this ROD Amendment require long-term (approximately 50 years) operation of various extraction and treatment systems in order

[10]A scenario for Alternative 3A was not evaluated in the groundwater model. However, Alternative 3A's performance is expected to be comparable to that of Alternative 3.

to meet the RAOs.

Potential danger to workers and to the environment during the implementation of Alternatives 3, 3A, 4, 5, 5RR and 6 would be higher than for Alternative 2 because of the need to install additional extraction and recharge wells. This short term risk would be greater for Alternatives 5RR and 6 because significantly more wells would be installed with these alternatives. Such short term risks can be minimized by adherence to established health and safety practices and standard engineering controls.

Each of the Alternatives 3, 3A, 4, 5, 5RR and 6 would be effective in the short-term while remediation goals are being achieved. As mentioned above, none of the alternatives considered are truly short-term remedies. All of the alternatives would require operation and maintenance for approximately the same amount of time.

F. Implementability: All of the retained alternatives use proven technologies that would be possible to implement, although there are some significant implementation issues associated with Alternatives 5, 5RR, and 6.

The remedial actions proposed under Alternative 2 have already been fully implemented. Therefore, it has been demonstrated that Alternative 2 is technically and administratively feasible. Since Alternative 2 requires no additional work, it the easiest alternative to implement.

Alternatives 3, 3A, 4, 5, 5RR, and 6 include installation of one extraction well, connection of this well to the existing Area 7 treatment facility, modification of the facility to accommodate the additional groundwater, and installation of a new recharge well. Although these modifications could be designed and completed relatively easily and in a reasonable time frame, such modifications make these alternatives more difficult to implement than Alternative 2.

Currently, the owner/operator of the MRTF where water from wells PCX-1, PVWC-14, and PVWC-15 are treated is not a party to either the first or second CDs. Such a situation does not provide EPA with the following: (1) the CERCLA authority to oversee and direct operations at the plant as needed to protect human health and the environment; and (2) the authority ultimately enforce the this ROD Amendment's requirements to extract and adequately treat the groundwater in the northern part of the Site in order to contain the plume and restore the aquifer. Alternative 3A makes the use of the MRTF, PVWC-14, PVWC-15 and PCX-1 optional. This allows for flexibility in the implementation of the remedy that none of the other alternatives provide. EPA believes that this makes Alternative 3A potentially easier to implement than the remaining alternatives.

Alternative 4 requires installation of one extraction in the Lower Aquifer and associated piping. Installation of wells in the Lower Aquifer is moderately difficult making Alternative 4 more difficult to implement than Alternatives 2, 3, and 3A.

Alternatives 5 and 5RR require procurement and installation of new well pumps and variable frequency drives (VFDs). Electrical upgrades would be required for the existing wells, one of which is about 50 years old. Such upgrades could present implementation

issues that are moderate to difficult making Alternatives 5 and 5RR more difficult to implement than Alternatives 2, 3, 3A and 4.

Alternative 5RR would require installation of six new recharge wells at Pima Park, conversion of an extraction well to a reinjection well, installation of over 16,000 feet of pipeline to transport treated water to the recharge wells and the three new reinjection wells along Scottsdale Road. Installation of the new wells would be very difficult from a logistical standpoint because the wells would be located in highly developed residential and commercial areas in south Scottsdale. Such factors make Alternative 5RR more difficult to implement than Alternative 5.

Alternative 6 requires two additional Area 7 extraction wells (as opposed to one in Alternatives 3, 3A, 4, 5, and 5RR) and adding three extraction wells in the Lower Aquifer with associated piping. As mentioned above installation of wells into the Lower Aquifer is technically more challenging than the installation of the shallower wells. Because Alternative 6 calls for three additional deep wells, it is anticipated that Alternative 6 would be the most difficult to implement.

G. Cost: The cost estimates in Table 6 on page 34 are not the estimates identified in the FSA. In the FSA, costs were estimated for each alternative based on the sum of the amount of money spent to date plus the amount of money to be spent in the future. In order to simplify the comparison of costs, Table 6 breaks the cost estimates down into the following: (1) the cost estimate in the FSA; (2) all costs incurred to date - which includes capital and O&M costs; (3) 50 years present worth cost; (4) cost to implement and/or operate the remedy starting now; and (5) the difference between the cost to implement/operate the remedies evaluated in the FSA minus the cost to implement/operate currently existing remedies.

As described previously in this ROD Amendment, Alternative 2 has already been constructed and operations and maintenance (O&M) costs have been incurred for several years. No additional capital costs will be associated with this alternative. The remaining alternatives have at least some capital costs and the O&M for each alternative is comparable. Assuming that the MRTF, PVWC-14, PVWC-15 and PCX-1 are all utilized, the cost of implementing Alternative 3A is anticipated to be relatively the same as the cost of implementing Alternative 3. The only costs that are currently anticipated to be greater for Alternative 3A than the costs estimated for Alternative 3 are the costs associated with the periodic updates of the groundwater model. Since the groundwater model itself has been developed and the groundwater monitoring costs are included in the estimates, the cost of inputting the data into the model and generating future plume projections is anticipated to be insignificant.

H. State Acceptance: The State of Arizona's Department of Environmental Quality and the Arizona Department of Water Resources both support the selection of Alternative 3A The State agencies do not accept Alternatives 5RR and 6 because they cost significantly more than 3A and do not provide proportionally better protection of human health and the environment or long-term effectiveness.

I. Community Acceptance:

EPA received some feedback from community members, the Community Involvement Group, the PRPs, the City of Scottsdale, SRP, and the Arizona-American Water Company. Although there were several requests for clarification of certain remedy components, the community has generally shown support for EPA's preferred alternative: 3A. Responses to significant and relevant comments received during the public comment period can be found in the Responsiveness Summary which is Part III of this ROD Amendment.

Although we received comments from the community we did not get input on each and every alternative. Therefore, this ROD Amendment does not document the community's acceptance or non acceptance of Alternatives 2, 4, 3, 5, 5RR, and 6.

Table 7 - Comparative Analysis of Alternatives

Criteria	2	3	3A	4	5	5RR	6
Protective	yes	yes	more protective	yes	yes	yes	yes
Meets ARARs	yes	yes	yes	yes	yes	yes	yes
Effective in the Long-Term	yes	yes	more effective	yes	yes	yes	yes
Reduces toxicity, mobility, or volume	eventually	third quickest reduction	third quickest reduction	third quickest reduction	second quickest reduction	second quickest reduction	quickest reduction
Effective in the Short-Term	maybe not	yes	yes	yes	yes	yes	yes
Implementable	yes - already implemented	relatively easy	easiest	relatively easy	difficult	difficult	most difficult
Difference between cost to implement & cost of existing remedies[11]	$0	$4,174,490	$ 4,174,490	$4,449,175	$6,740,385	$19,393,940	$42,278,649
State OK	no	yes	yes	yes	yes	no	no
Community OK	see Section X I above	see Section XI. above	generally yes	see Section X I. above	see Section X.I. above	see Section X.I. above	see Section X I. above

[11] Cost figures found in Table 6 on page 34.

XI. **Principal Threat Wastes:** The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. This ROD Amendment mainly applies to contaminated groundwater. Contaminated groundwater generally is not considered to be a source material. The soil contamination at NIBW that was considered a source material has been remediated. Therefore, there are no known source areas presently at NIBW and as a result principal threat waste was not considered for this ROD Amendment.

XII. **Selected Remedy: Preferred Alternative**

Based on current information, EPA is selecting Alternative 3A, which requires groundwater containment in the Middle and Lower Aquifers, restoration of the groundwater to drinking water standards via removal of the COCs, groundwater extraction at Areas 7 and 12, continued groundwater monitoring in the Upper, Middle, and Lower Aquifers, periodic updates to the groundwater model, installation of one new extraction well, and treatment of all extracted groundwater.

The Selected Remedy inherently includes the requirements of the OU I and OU II RODs. Since a majority of this work has been completed, only the components that currently require work to be done are discussed below. The Selected Remedy consists of the following:

- Groundwater monitoring in the Upper, Middle, and Lower Aquifers including the periodic input of current groundwater data into the groundwater model to assess the accuracy over time of model projections in the FSA;
- Groundwater plume containment in the Middle and Lower Aquifers as measured by monitoring of sentinel wells and demonstration of inward hydraulic gradient;
- With the exception of continued use of the MRTF and wells PVWC-14, PVWC-15 and PCX-1, the voluntary actions (identified in Section IX.C., pages 27-28) will become required actions under Alternative 3A;
- Treated water and groundwater left in place shall not contain VOCs present above the cleanup standards (*see* Table 3 on page 24);
- Extraction of groundwater from CGTF extraction wells;
- Operation of the CGTF to treat the groundwater extracted from CGTF extraction wells;
- Implementation of a priority pumping scheme which includes increased pumping from the most contaminated CGTF extraction wells;
- Use of spare pumps to avoid long down-times for CGTF extraction wells (COS71 and COS75A);
- The goal for minimum total annual average pumping rate will remain at 6,300 gallons per minute for the wells connected to the CGTF;
- Extraction of groundwater from wells PVWC-14, PVWC-15 and PCX-1 or wells that are equivalent to these wells in location, depth, design, capacity etc.
- Treatment of the groundwater extracted from wells PVWC-14, PVWC-15 and PCX-1 or wells that are equivalent in location, depth, design, capacity etc.;
- The goal for minimum total annual average pumping rate will be established at 5,480 gallons per minute for the wells PVWC-14, PVWC-15 and PCX-1 (or wells that are equivalent in location, depth, design, capacity etc.);
- Operation of the Area 7 and Area 12 groundwater treatment systems;
- Installation of one extraction well and one recharge well in the vicinity of Area 7;

- Upgrades to the Area 7 treatment plant to accommodate increased production;
- Localized containment of the groundwater plumes specific to Area 7 and Area 12;
- If groundwater data indicates that the Area 7 and Area 12 groundwater plumes are migrating toward the southwest margin, contingency actions, potentially including additional wells or increased pumpage in these areas, shall be evaluated and implemented; and
- Completion of the soil cleanup action currently in progress at Area 7.

Most Superfund remedies that include remediation of groundwater contamination include institutional controls as a component. Institutional controls are administrative mechanisms that EPA uses to prevent installation of drinking water wells into areas of groundwater contamination. This is a complicated issue at NIBW because the plume of groundwater contamination exists beneath numerous private properties.

The potential for the private use of groundwater via domestic wells at NIBW is very small, because potable water is provided by regulated water providers and it is not necessary to drill domestic wells. However, there is a slight possibility that a citizen could unknowingly drill a well into the plume and drink contaminated water. There is also a possibility that a large volume production well could be installed in the area that could affect groundwater movement and, therefore, compromise the effectiveness of the remedy. The ADWR regulates groundwater in the state. All wells drilled in the State of Arizona must be permitted by ADWR. Licensed drillers may not legally drill a well without such a permit. Because all individuals who apply for drilling permits within or near the NIBW site are informed in writing by ADWR that the groundwater is contaminated, this should deter individuals from installing and using domestic drinking water wells. Arizona's Well Spacing and Impact Rules regulate the placement of new and replacement production wells in areas such as NIBW. In accordance with the Well Spacing and Impact Rules, new production wells must be located in such a manner that nearby wells of record, such as the wells used for cleanup activities at NIBW, are not adversely affected. In addition, ADWR regulates well construction so that vertical cross-contamination between aquifers does not occur at sites such as NIBW.

It should be noted that the Selected Remedy will be required to meet the Remedial Action Objectives (*see* Section VIII., page 24). The alternatives evaluated in this ROD Amendment all meet the threshold criteria and any of the alternatives or any combination of components could have been selected. Because it is often necessary during the design and implementation of remedial actions to alter components within the system in order to achieve optimal performance, if it is determined that any of the Remedial Action Objectives are not being met once the Selected Remedy is fully implemented, additional actions could be deemed necessary.

EPA believes Alternative 3A meets the threshold criteria and provides the best balance of tradeoffs among the alternatives. EPA expects the Selected Remedy to satisfy the following statutory requirements of CERCLA Section 121(b): (1) to be protective of human health and the environment; (2) to comply with ARARs; (3) to be cost effective; (4) to utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) to satisfy the preference for treatment as a principal element.

A. Summary of the Rationale for the Selected Remedy: The principal factors considered in selecting the remedy were as follows:

1. From the time of the OU I CD, the CGTF extraction wells have had minimum pumping requirements. No such requirements were ever established for the extraction wells currently connected to the MRTF. EPA understands that effective extraction and treatment of the groundwater at NIBW will not be achieved by minimum pumping requirements. However, in order to maintain capture of the plume in the Lower Aquifer, EPA believes that goals for minimum total annual average pumping rates for PVWC-14, PVWC-15 and PCX-1 (or wells that are equivalent in location, depth, design, capacity etc.) are necessary. Alternative 3A is the only alternative that includes such requirements.

2. EPA worked cooperatively with the PRPs and the state to identify and implement the *remedy enhancements*. For enforcement purposes, it is important for the previously voluntary actions to become required actions as part of the Selected Remedy in this ROD Amendment. Alternative 3A is the only alternative that includes this requirement.

3. It is important for EPA to select a remedy that is effective and feasible to implement. Currently, the owner/operator of the MRTF is not a party to either the first or second CDs. Because the use of wells PVWC-14, PVWC-15, and PCX-1 (or the equivalent) is an integral and essential part of groundwater containment at the NIBW Site, this situation does not allow EPA to effectively oversee and direct the implementation of the Selected Remedy. It is essential for EPA to be able to enforce the remedies selected in RODs, otherwise EPA could not ensure protection of human health and the environment. Alternative 3A makes use of the MRTF, PVWC-14, PVWC-15 and PCX-1 optional. This allows for flexibility in the implementation of the remedy that none of the other alternatives provide. This makes Alternative 3A easier to implement than the remaining alternatives.

4. Groundwater monitoring is essential to the Selected Remedy to ensure that the extraction and treatment systems are effectively containing the plumes. EPA believes it is also important to include the periodic input of current groundwater data into the groundwater model to assess the accuracy over time of model projections in the FSA. Alternative 3A is the only alternative that includes this requirement.

B. Description of the Selected Remedy: The performance standards for the Selected Remedy Alternative 3A are as follows:

1. *Groundwater Monitoring*:
   a. An up-to-date groundwater monitoring and evaluation program (GM&EP) shall be developed.
   b. The GM&EP shall address conditions in the Upper, Middle, and Lower Aquifers.
   c. During the development of the GM&EP the groundwater monitoring

requirements from the OU I and OU II RODs shall be re-evaluated to ensure that such requirements are still relevant.

d. The GM&EP shall include the periodic input of current groundwater data into the groundwater model to assess the accuracy over time of model projections in the FSA and to assess the effectiveness of the Selected Remedy.

e. A GM&EP work plan shall be developed subject to approval by EPA in consultation with ADEQ and ADWR.

f. Once the work plan has been approved, the GM&EP shall replace the existing groundwater monitoring requirements.

2. *Extraction and treatment of groundwater from the central portion of NIBW:*

a. Groundwater shall be extracted from the CGTF extraction wells (COS31, COS71, COS72, and COS75A) to ensure that the groundwater contamination is not migrating to the southwest margin.

b. Groundwater shall be extracted from the CGTF extraction wells in accordance with a priority pumping scheme which includes increased pumping from the most contaminated of the CGTF extraction wells (COS71 and COS75A);

c. The goal for minimum total annual average pumping rate shall be 6,300 gallons per minute for the CGTF extraction wells.

d. The extracted groundwater from the CGTF extraction wells shall be pumped to the CGTF for treatment.

e. Treated groundwater from the CGTF shall meet the cleanup standards in accordance with Section XII.B.7.a., on page 46.

f. Spare pumps shall be purchased and used to avoid long down-times for COS71 and COS75A. In the event that a pump in well COS71 or COS75A fails, a spare pump shall be installed within two weeks of discovery of pump failure.

g. The Operation and Maintenance Plan (O&M Plan) for the CGTF shall be revisited to make sure the plant is in compliance with all requirements of this ROD Amendment.

h. The Remedial Design Work Plan (RDWP) for implementation of the Selected Remedy shall include, but not be limited to, the following:

(a) Identification of sentinel wells to evaluate achievement of capture;

(b) If adequate sentinel wells do not exist then such wells shall be installed; and

(c) Identification of criteria necessary to demonstrate achievement of capture. Such criteria should include, but not be limited to, demonstration of inward hydraulic gradient.

3. *Extraction of groundwater from the northern portion of NIBW:*

a. Groundwater shall be extracted from either wells PVWC-14, PVWC-15 and PCX-1 or wells that are equivalent in location, depth, design, capacity etc. to ensure that the groundwater contamination in the Lower Aquifer is not migrating further to the north.

b. The goal for the minimum total annual average pumping rate shall be

established at 5,480 gallons per minute for wells PVWC-14, PVWC-15 and PCX-1 (or wells that are equivalent in location, depth, design, capacity etc.).

c. The groundwater extracted from wells PVWC-14, PVWC-15 and PCX-1 (or wells that are equivalent in location, depth, design, capacity etc.) shall be treated using air stripping technology. Such treatment may take place at the MRTF, at an alternate location or via the use of wellhead treatment, if feasible.

d. Treated groundwater from wells PVWC-14, PVWC-15 and PCX-1 (or wells that are equivalent in location, depth, design, capacity etc.) shall meet the cleanup standards in accordance with Section XII.B.7.a., on page 46.

e. The O&M Plan for the MRTF (if the MRTF is used as part of the Selected Remedy) shall be revisited to make sure the plant is in compliance with all requirements of this ROD Amendment.

f. The RDWP for implementation of the Selected Remedy shall include, but not be limited to, the following:

(a) Identification of sentinel wells to evaluate achievement of capture;

(b) If adequate sentinel wells do not exist then such wells shall be installed; and

(c) Identification of criteria necessary to demonstrate achievement of capture. Such criteria should include, but not be limited to, demonstration of inward hydraulic gradient.

4. *Extraction and treatment of groundwater at Area 7*:

a. One new extraction well shall be installed in the Middle Aquifer in the vicinity of Area 7[12].

b. One new recharge well shall be installed in the Upper Aquifer in the vicinity of Area 7.

c. Groundwater shall be extracted from Area 7 extraction wells (7EX1/2, 7EX3A-MA, 7EX4-MA, and 7EX5-MA) to ensure that the localized groundwater contamination plume at Area 7 is contained and not migrating toward the southwest margin.

d. Groundwater extraction from the Upper Aquifer at Area 7 may be terminated as performance objectives are achieved, such termination may only occur upon approval by EPA.

e. Contingency actions, including but not limited to, additional wells or increased pumpage at Area 7 shall be evaluated and implemented if groundwater data indicates that the Area 7 groundwater plume is migrating toward the southwest margin.

f. The O&M Plan for the Area 7 groundwater treatment plant shall be revisited to make sure the plant is in compliance with all requirements of this ROD Amendment.

g. The RDWP for implementation of the Selected Remedy shall include,

[12] This well was approved by EPA and has already been installed.

but not be limited to, the following:

(a) Identification of sentinel wells to evaluate achievement of capture at Area 7;

(b) If adequate sentinel wells do not exist then such wells shall be installed, and

(c) Identification of criteria necessary to demonstrate achievement of capture at Area 7. Such criteria should include, but not be limited to, demonstration of inward hydraulic gradient.

h. The Area 7 groundwater treatment plant shall be upgraded to accommodate increased production from the new extraction well.

i. The extracted groundwater from the Area 7 extraction wells shall be treated at the existing Area 7 groundwater treatment plant.

j. Treated groundwater from the Area 7 plant shall meet the clean-up standards in accordance with Section XII.B.7.b., on page 46.

5. *Extraction and treatment of groundwater at Area 12*:

a. Groundwater shall be extracted from Area 12 extraction wells (12M-EX1 and the Granite Reef well) to ensure that the localized groundwater contamination plume at Area 12 is contained and not migrating toward the southwest margin.

b. Contingency actions, including but not limited to, additional wells or increased pumpage at Area 12 shall be evaluated and implemented if groundwater data indicates that the Area 12 groundwater plume is migrating toward the southwest margin.

c. The O&M Plan for the Area 12 groundwater treatment plant shall be revisited to make sure the plant is in compliance with all requirements of this ROD Amendment.

d. The RDWP for implementation of the Selected Remedy shall include, but not be limited to, the following:

(a) Identification of sentinel wells to evaluate achievement of capture at Area 12;

(b) If adequate sentinel wells do not exist then such wells shall be installed, and

(c) Identification of criteria necessary to demonstrate achievement of capture at Area 12. Such criteria should include, but not be limited to, demonstration of inward hydraulic gradient.

e. The extracted groundwater from the Area 12 extraction wells shall be treated at the existing Area 12 groundwater treatment plant.

f. Treated groundwater from the Area 12 plant shall meet the clean-up standards in accordance with Section XII.B.7.b., on page 46.

6. *Soil Cleanup at Area 7*: The Soil cleanup action currently in progress at Area 7 shall be completed in accordance with the OU II ROD, the second Consent Decree (1993), and the work plans previously approved by EPA.

7. *Groundwater Cleanup Standards*

a. Treated groundwater from the NIBW site that is used as part of a drinking water supply shall be treated to meet the cleanup standards for the contaminants of concern identified in Table 3 on page 24. When operating properly, the current treatment facilities that provide potable water to the public (the CGTF and the MRTF) are consistently treating the contaminated groundwater to non-detect levels without averaging the sampling results.

(1) If a cleanup standard is exceeded based on the analysis of any single sampling event of the effluent for the CGTF or MRTF (or alternate) EPA and the state shall be notified immediately;

(2) The RDWP for implementation of the Selected Remedy shall include, but not be limited to, the following:

(a) Procedures for collection of confirmation of cleanup standard exceedance samples; and

(b) Definition of measures that must be taken to ensure that the plant (or specific treatment tower) is operating properly.

b. Treated groundwater from the NIBW site that is discharged to a surface water body or used to recharge the groundwater shall be treated to meet the substantive requirements of National Pollution Discharge Elimination System (NPDES) permits or Underground Injection Control Program requirements.

c. Discharge of water pumped from an aquifer at NIBW that does not meet Arizona aquifer water quality standards and is put to beneficial use other than drinking water should meet the Health-Based Guidance Levels (HBGLs) identified in the Second Draft, Health-Based Guidance Levels for Specific End-Uses of Remediated Groundwater, Arizona Department of Health Services, June 1998.

d. As established in the 1991 ROD, the groundwater cleanup standards apply to both treated water and groundwater left in place.

8. *Aquifer Restoration*: The Upper, Middle, and Lower Aquifers shall be restored to their beneficial use as a drinking water aquifer.

9. *Plume Containment*: The requirement of plume containment is addressed via individual treatment system above. Contingency actions, including but not limited to installation of additional wells and revised pumping volumes, shall be evaluated and implemented if groundwater data indicates that containment has not been achieved in the Middle Aquifer, the Lower Aquifer, at Area 7 or at Area 12.

10 *Communication Plan*: A communication plan shall be developed that will outline the public notification requirements in the event that there is a malfunction at either the CGTF or the MRTF (assuming the MRTF is utilized as part of the remedy). This plan will specifically address incidents that result in water containing VOCs greater than the MCL being released into public drinking water supplies. This communication plan will be subject to EPA approval. This requirement is included based on comments received during the public comment

period.

C. Summary of the Estimated Remedy Costs:

The estimated cost for the Selected Remedy Alternative 3A is detailed in the Table 8 on page 47. The costs are broken down into: incurred capital costs, projected capital costs, projected future capital cost (present worth), projected annual O&M, and 50 Years future O&M (present worth).

Table 8: Alternative 3A Cost Estimate	
Description	**Cost**
INCURRED CAPITAL COSTS	
Incurred monitoring capital costs	$ 7,107,000
Incurred extraction and treatment capital costs	$ 20,822,300
Incurred source control capital costs	$ 8,087,000
Incurred O&M costs	$ 29,937,400
Subtotal	$ 65,953,700
PROJECTED CAPITAL COSTS	
Installation of extraction well (Area 7)	$ 294,375
Upgrades to Area 7 groundwater treatment plant	$ 253,375
Administrative costs	$ 265,750
Spare pump costs	$ 87,500
Subtotal	$ 901,000
PROJECTED FUTURE CAPITAL COSTS (present worth)	
Includes upgrades/replacement/rehabilitation of existing equipment	$ 2,135,980
PROJECTED ANNUAL O&M COSTS	
	$ 4,335,100
50 YEARS FUTURE O&M COSTS (present worth)	
	$ 59,701,730
Total Net Present Worth	**$ 128,692,410**

The information in these cost estimate summary tables are based on the best available information regarding the anticipated scope of the remedial alternative. This assumes that extraction of groundwater from the northern portion of NIBW will be accomplished by using wells PVWC-14, PVWC-15 and PCX-1 and the MRTF. If alternative wells and treatment facilities are required, the costs will increase. Changes in the cost elements are also likely to occur as a result of new information and data collected during the

engineering design of the remedial alternative, or as new technologies are tested. Major or significant changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Difference, or a ROD Amendment, as appropriate. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

D. Expected Outcome of the Selected Remedy: The expected outcome of the Selected Remedy is the restoration of the aquifer to beneficial use (drinking water source) after cleanup levels for the contaminants of concern are achieved in an estimated 50+ years. Final cleanup levels for groundwater are provided in Table 3 on page 24.

XIII. Statutory Determinations:

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that, during the implementation and upon completion of, the selected remedial action must comply with applicable or relevant and appropriate environmental standards established under federal and State environmental laws unless a waiver is justified. The Selected Remedy must also be cost-effective and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as their principal element. The following section discusses how the Selected Remedy addresses these statutory requirements and preferences.

A. Protection of Human Health and the Environment: Exposure to contaminated groundwater through drinking water supplies is the area of potential risk. The Selected Remedy will contain and treat the contaminated groundwater plumes to drinking water standards. Since no exposure to site-related contaminants should occur, actual exposure levels will be within the acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and below the Hazard Index of 1 for non-carcinogens.

The remedy will not have detrimental cross-media impacts. Treatment systems will comply with air quality requirements. Treated groundwater will go directly to the water distribution systems, discharged to surface water or used to recharge the Upper Aquifer.

B. Compliance with Applicable or Relevant and Appropriate Requirements: Remedial actions selected under CERCLA must comply with all ARARs under federal environmental laws or, where more stringent than the federal requirements, State environmental or facility siting laws. Where a State has delegated authority to enforce a federal statute, such as RCRA, the delegated portions of the statute are considered to be a Federal ARAR unless the State law is broader or more stringent than the federal law. Applicable or relevant and appropriate requirements are identified on a site-specific basis from information about site-specific chemicals, specific actions that are being considered, and specific features of the site location. There are three categories of ARARs: (1) chemical-specific requirements; (2) action-specific requirements; and (3) location-specific requirements.

Chemical-specific ARARs are risk-based cleanup standards or methodologies which, when applied to site-specific conditions, result in the development of cleanup standards for COCs.

Location-specific ARARs are restrictions placed on health-based concentrations of hazardous substances or the conduct of activities because of the special locations, which have important geographical, biological or cultural features. Examples of special locations include wetlands, flood plains, sensitive ecosystems and seismic areas.

Action-specific ARARs are technology-based or activity-based requirements or limitations on actions to be taken to handle hazardous wastes. They are triggered by the particular remedial activities selected to accomplish a remedy.

The Selected Remedy will comply with all ARARs. The ARARs for actions identified in this ROD Amendment are identified in the attached table.

C. Cost-Effectiveness: In EPA's judgement, the Selected Remedy is cost-effective and represents a reasonable value. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." [Note: NCP Section 300.430(f)(1)(ii)(D)] This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., the alternatives are both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of remedial Alternative 3A was determined to be proportional to its costs and hence this alternative represents a reasonable value for its cost.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the maximum Extent Practicable: EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Alternative 3A provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

E. Preference for Treatment as A Principal Element: There are no known remaining source materials at NIBW. The Selected Remedy will treat the contaminated groundwater to achieve the cleanup levels. The extraction systems will contain the contaminated groundwater plumes, preventing further migration of contamination. The Area 7 and Area 12 extraction systems will also contain the localized areas of contamination and prevent the plumes from moving toward the southwest margin.

F. Five-Year Review Requirements: Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining within NIBW above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain

remedial action objectives and cleanup levels, a policy review will be conducted within five years of construction completion for NIBW to ensure that the remedy is, or will be protective of human health and the environment.

G. Documentation of Significant Changes: In response to comments received during the public comment period EPA has made the following changes to the remedy:

1. A comment was received that indicated the following: Not all groundwater treatment systems at the site utilized the air stripping technology. This statement is correct, the Area 7 groundwater system uses UV Oxidation to treat Area 7 groundwater. This UV oxidation system was approved by EPA and the ROD Amendment reflects that this is the required treatment technology for Area 7 groundwater.

2. A comment was received that requested more diligent notification requirements in the event that either of the treatment plants experience treatment interruptions (*see* comment I.C.8 on page 59). EPA agrees that notification procedures should be developed that will serve to inform the public as expediently as possible in the event of a treatment interruption. As a result, EPA has included a requirement for a Communication Plan in this ROD Amendment (*see* Section XII.B.10, page 46).

3. The City of Scottsdale pointed out in their comments that due to the increasingly high levels of nitrates in the groundwater at the Site the water treated at the CGTF may not be potable. Therefore, the RAO regarding providing a potable water supply to the City of Scottsdale has been revised as follows: "Reuse of the water treated at the Site to the extent possible in accordance with Arizona's Groundwater Management Act".

4. The PRPs pointed out in their comments that the 1991 Consent Decree identifies a 90-day rolling average for determining exceedances of the treatment criteria. Based on this comment, this ROD Amendment does not require cleanup standard exceedances to be based on a single sampling event. However, it is important to note that:
   a. The community involvement group (CIG) for NIBW has expressed concern on numerous occasions that averaging the results of drinking water samples to measure compliance with MCLs is not stringent enough to protect human health and the environment; and
   b. When operating properly, the current treatment facilities that provide potable water to the public (the CGTF and the MRTF) have consistently treated the contaminated groundwater to non-detect levels without averaging the sampling results.

   Therefore, it is EPA's preference to determine the exceedance of the cleanup standards based on one single sampling event.

5. During a review for consistency with the 1988 and 1991 RODs, it was discovered that the cleanup standard selected for chloroform in the 1991 ROD was not the MCL. Instead the cleanup standard selected for chloroform was 6

μg/l which was based on a one-in-one million excess cancer risk level. EPA has determined that it is appropriate to retain 6 μg/l as the cleanup standard for chloroform (*see* Section VII.E. on page 23).

PART 3: THE RESPONSIVENESS SUMMARY

I. Stakeholder Issues and EPA Responses

The volume of community comments on the NIBW Proposed Plan was moderate. Oral comments were received and recorded at the public meeting held on May 9, 2001. Comments were also provided in writing during the comment period. In general, the public supported the preferred alternative.

All comment letters and the transcript of the public meeting can be found in the Administrative Record. A summary of the relevant comments received and EPA's responses are as follows.

A. Significant questions and comments received during the public meeting

1. Has any connection been established between the contamination found in the groundwater at NIBW and local cases of cancer?

   Response: EPA has not conducted specific cancer studies for the NIBW area. EPA's Superfund program does not typically study cancer incident rates. The Superfund program works to make sure that there is no current exposure to hazardous chemicals that could potentially cause cancer in the future. Other agencies such as the Agency for Toxic Substances and Disease Registry or the Arizona Department of Health Services may be better equipped to study cancer incidences in the area. In cleaning up Superfund sites, EPA focuses on current risk and current exposures that may increase the potential to contract cancer. EPA evaluated the risk for contracting cancer based on exposure scenarios of 70-years.

2. Who is paying for the cleanup?

   Response: The cleanup is primarily being paid for by the Participating Companies: Motorola, Siemens Corporation and Smith-Kline Beecham.

3. What was the concentration of contaminants in the groundwater at the time that the municipal water supply wells were taken out of service?

   Response: The municipal wells that were taken out of service were: 6, 31, 71, 72, and 75. The highest concentration of TCE in these wells near the time that they were shut down was approximately 390 µg/l.

4. One community member was concerned about the effect of the site contamination on the neighboring Salt River Pima Maricopa Indian Community (SRPMIC).

   Response: The comprehensive groundwater monitoring efforts were explained to this citizen. It was clarified that EPA has extensive knowledge of where the contamination is -- it is not located beneath SRPMIC lands. Based on the information currently available to EPA, the groundwater flows from SRPMIC toward the NIBW site eliminating this possibility.

5. One community member was concerned about mercury contamination in the area.

Response: No mercury was detected as part of the NIBW groundwater or soil investigations. Mercury is not considered a site contaminant.

6. One citizen asked if the Phoenix Active Management Area (Phoenix AMA) staff was consulted in EPA's identification of the preferred alternative.

Response: Mason Bolitho from the Arizona Department of Water Resources (ADWR) indicated that ADWR consulted with the Phoenix AMA as part of their review of the proposed plan. ADWR supports EPA's preferred alternative and the Phoenix AMA was in agreement with ADWR's position. ADWR's statements are documented in the public meeting transcript which can be found in the Administrative Record.

7. One citizen asked why EPA's preferred alternative only included one additional well and not three.

Response: As a result of EPA's analysis of the alternatives it was determined that additional extraction wells would not sufficiently increase the degree of protectiveness or effectiveness of the remedy to justify the cost of the additional wells and the disruption that would result from installation of the wells and connection of the wells to various treatment plants.

8. One citizen commented that the Miller Road Treatment Facility (MRTF) did not have adequate controls to ensure that the groundwater was being treated effectively.

Response: There were two incidents in which untreated water was released from the MRTF in February 2001. This occurred in part because of an electrical problem. This electrical problem caused the control system to malfunction. This situation has been fixed and the control system is currently working properly. As part of the Remedial Design efforts for this remedy, EPA will revisit the operating parameters of the CGTF and the MRTF (assuming that the MRTF is used as part of the remedy) to ensure that adequate controls are in place.

9. One citizen mentioned that the community has repeatedly voiced concerns regarding the potential for subsidence as a result of the NIBW remedy.

Response: Subsidence is addressed in Section I.C.9. and Section II. A. of this Responsiveness Summary.

10. One citizen asked for an explanation for the state's rejection of alternatives 5RR and 6.

Response: Mason Bolitho from ADWR explained that the state agencies (ADWR and ADEQ) met to discuss the proposed plan and the alternatives being

evaluated. Together ADWR and ADEQ evaluated the alternatives based on the nine criteria and state requirements. Mr. Bolitho indicated that the additional benefit from alternatives 5RR and 6 did not justify the increased costs. ADWR's statements are documented in the public meeting transcript which can be found in the Administrative Record.

11. One citizen asked what the City of Scottsdale's (COS) position was.

Response: EPA responded that the City had not provided comments on the proposed plan as of the time of the public meeting. City comments were received before the end of the comment period. These comments are addressed in Section I.E. below.

12. One citizen asked if we had changed the boundaries of the NIBW site.

Response: The legal definition of a Superfund site is the area where contamination is detected and the areas where contamination comes to be located. Although EPA started with a specific study area, site definitions are refined as more data is gathered. For sites with groundwater contamination, it is not uncommon for site boundaries to change frequently.

13. The following written comment was received during the public meeting: "I like plan #6".

Response: It is assumed that this commenter is referring to Alternative 6 identified in the proposed plan. Alternative 6 would not sufficiently increase the degree of protectiveness or effectiveness of the remedy to justify the additional cost.

B. Significant questions and comments received from citizens in writing during the public comment period

1. Where are the current drinking water wells located? Are they being threatened?

Response: There are four drinking water wells that are connected to the CGTF. These wells are located within the plume of contamination and are already contaminated. Water from these wells is treated to meet drinking water standards and then blended with water in the City of Scottsdale's (the City) Reservoir 80 before being distributed into the drinking water system. These wells are:

Well 75A - located northwest of the intersection of Indian School and Hayden Road s.
Well 71and Well 72 - located off of Thomas Road west of the intersection of Thomas and Hayden Roads.
Well 31 - located northeast of the intersection of Thomas and Hayden Roads.

There are three drinking water wells that are connected to the MRTF. One of these wells(PCX-1) is located within the plume of contamination and is already

contaminated. The other two MRTF wells are not contaminated. Water from the MRTF wells is treated to meet drinking water standards and distributed into the Arizona-American Water Company's drinking water system. These wells are:

PCX-1. is located along the Arizona Canal, north of Chappural Road west of Miller Road.
PVWC-14[13]: is located northeast of the intersection of Miller and McDonald's Roads
PVWC-15 : is on MRTF property, 5975 N. Miller Road.

The following active wells are near the Superfund site but outside of the current plume. Based on our groundwater modeling data, these wells are not being threatened. The information that is gathered as part of our ongoing groundwater monitoring program will alert us if any of these wells do become threatened.

Well 74: 8601 E. Earll Drive. This well is immediately to the northwest of the CGTF.
Well 3: 8755 E. Jackrabbit
Well 4: 6030 N. Pima Rd.
Well 11: 8190 Via Paseo Del Norte.
Well 12: 7602 E. McCormick Parkway
Well 14: 7401 E. Indian Bend.
PVWC-11: north of McDonald Drive along the Arizona Canal
PVWC-12: north of McDonald Drive along the Arizona Canal
PVWC-16: north of McDonald Drive along the Arizona Canal
PVWC-17: north of McDonald Drive slightly west of the Arizona Canal

For exact locations of PVWC wells please see Figure 9 on page 29 of the Decision Summary.

2. The location of the Siemens plant depicted on EPA diagrams is incorrect. The Siemens plant was near the corner of Thomas Road and Pima Road. On the map, EPA has it located near Miller Road and Indian School.

Response: There was a source area that was investigated at the northwest corner of Thomas and Pima Roads. This was the MicroSemi site which was referred to as Area 6. Soil cleanup work was conducted at Area 6. However, what is more commonly referred to as "the Siemens plant" is Area 7 and it is located off of 75th Street, not far from the corner of 75th Street and Second Street.

3. EPA mentions the risks for cancer associated with the plume, what about the health risks that are non-cancerous?

Response: The conclusions reached in the OU I and OU II risk assessments are

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[13] PVWC stands for Paradise Valley Water Company. Paradise Valley Water Company is now known as Arizona -American Water Company.

still valid and a new risk assessment was not conducted for this ROD Amendment. Any actual human exposure to the contaminants in groundwater at NIBW occurred before the Scottsdale drinking water wells were found to be contaminated in 1981. Since those drinking supply wells were taken out of service, there has been no long-term human exposure to the contamination in the groundwater. Therefore, there is no cancer or non-cancer effects due to exposure to the plume today. The Public Health Assessment which was conducted in 1988 as part of the Operable Unit Feasibility Study for Remediation of Groundwater in the Southern Scottsdale Area concluded that no non-carcinogenic health risks were expected from exposure to the contaminated groundwater.

4. What treatment technology is being proposed or is being performed for the extracted contaminants?

Response: The MRTF, the CGTF and the Area 12 groundwater treatment plants all utilize air stripping to remove the VOCs from the groundwater. The Area 7 groundwater treatment plant utilizes UV Oxidation.

5. What are the risks from the cleanup technology?

Response: The most common risk of cleanup technologies are based on the construction risks while the treatment units are being built. At NIBW almost all of the remedy has been constructed - therefore such risks are not anticipated.

There are air emissions from the various groundwater treatment plants at NIBW. All of the plants currently comply with federal, state and local emissions standards. The Community Involvement Group had concerns about cumulative risks due to air emissions from the treatment plants. EPA's contractor, CH2M Hill, conducted a study of cumulative air emissions and did not identify any significant risks. Therefore, no risks are anticipated due to the emissions from these plants. he CH2M Hill air emissions study can be found in the Administrative Record. It should be noted that the air stripping technology is widely used at Superfund sites across the country and has been demonstrated to be safe and reliable for removing volatile organic compounds from groundwater.

With all technology, there is the risk of malfunction and human error. Such risks cannot be estimated. EPA handles isolated incidents on a case-by-case basis.

6. How long will the remediation take?

Response: It is estimated that the groundwater cleanup standards will be met in approximately 50 years.

C. Significant questions and comments received from members of the NIBW Community Involvement Group (CIG) in writing during the public comment period: EPA received several letters from individual CIG members. Many of the comments from the individual CIG members identify the same issues. These issues are categorized and summarized below and are all considered to be comments from the CIG group.

Area 7

1 The CIG is concerned with the experimental use of UV oxidation and ozone treatment at the Area 7 groundwater treatment plant.

Response: Siemens proposed to augment its remediation efforts at Area 7 with installation of an ozone injection system. In 1999, a pilot study and test of ozone injection was conducted. EPA approved this pilot study but has not approved full implementation of the ozone injection system at Area 7.

The currently used groundwater treatment system at Area 7 utilizes UV oxidation followed by air stripper polishing. Two (soon to be three) Middle Aquifer (MAU) wells and one Upper Aquifer well extract groundwater that is treated at the Area 7 groundwater treatment plant. Treated groundwater is recharged into the Upper Aquifer using a recharge well located approximately 600 feet north of Area 7. The design for the MAU groundwater extraction and treatment system (GWETS) was approved by EPA in December 1997. Construction on the GWETS began in November 1998 and was completed in June 1999. Initial startup operations began in June 1999. At standard flow rates (approximately 370 gpm) the UV Oxidation technology removed approximately 90% of the VOCs from the groundwater. This water is then treated using air stripping. Since the GWETS began regular operation, the air stripping has consistently reduced the concentration of VOCs to less than 0.5 ppb before discharge to the reinjection well. This operational data demonstrates that the UV oxidation technology is effective for treating VOCs in the groundwater at Area 7 at NIBW.

2. Because a new well is being installed at Area 7, the CIG is concerned about the capacity of the Area 7 treatment plant and its ability to treat the groundwater to meet the 5 ppb standard. There is a specific concern regarding the monitoring requirements for the treated water - one CIG member indicated that the water treated at Area 7 should be tested weekly. The CIG wants to be assured that no water above 5 ppb gets reinjected.

Response: Installation of a new extraction well at Area 7 will increase the flow rates of water to be treated at the GWETS. However, the Selected Remedy also includes upgrades to the Area 7 treatment plant to ensure that the plant can handle the increased volume of water. Following the upgrades and connection of the new well to the system, the plant will undergo a test period in which it will be verified that the plant can handle the increased volume prior to discharge to the reinjection well.

3. The CIG is concerned about the amount of TCE present at the Siemens site that could act as a continuing source of pollution. The CIG specifically asked what the total amount TCE present at the Siemens site is and how long it would take to remove the TCE at the Siemens site

Response: The only TCE present at the Siemens site (Area 7) that could pose a continuing threat to groundwater is found in soil contamination. This is because the groundwater contamination at Area 7 is not in the form that would allow it to be a continuing source. In other words the groundwater contamination is not a Dense Non-Aqueous Phase Liquid (DNAPL). DNAPLs have a specific gravity greater than one and they are immiscible with water (i.e., they form a separate liquid phase). DNAPLs have a tendency to penetrate the water table and sink into an aquifer where they may slowly dissolve making them a serious source of groundwater contamination. If the contamination at NIBW were characterized as a DNAPL; then the DNAPL itself would be considered a continuing source of groundwater contamination.

In May of 2001, Levine Fricke, Siemens contractor, submitted a document to EPA entitled "Operation and Evaluation Report North Indian Bend Wash - Area 7 Soil Vapor/Groundwater Extraction and Treatment System (June 1999 through December 2000)". This report provides the documentation that the VOC contamination at Area 7 has been reduced as a result of the Soil Vapor Extraction remediation efforts. The report concludes that the soil at Area 7 no longer presents a threat to groundwater, and therefore the soil cleanup is complete. EPA is in the process of reviewing this report. Therefore, the amount of TCE present at the Siemens site is no longer significant because soil remediation efforts have been completed.

Notification Requirements

4. The CIG expressed concern with the notification requirements to EPA, ADEQ, ADWR and the City of Scottsdale when a malfunction occurs at either of the treatment plants that would result in water customers being served drinking water that exceeds 5 ppb TCE.

Response: Notification requirements like the ones described above are operational parameters that are typically addressed during the design of the remedy or development of the operation and maintenance plans. Unlike the situation at NIBW, in most instances EPA is selecting a cleanup action that has not already been implemented. In the past, if situations came up where public notification was appropriate, EPA worked with the Participating Companies and the City of Scottsdale to make sure notice was given to the citizens. EPA understands that the CIG believes that the efforts of the Arizona-American Water Company regarding the latest incidences at the MRTF were inadequate. Operation of the MRTF is not currently governed by a Superfund enforcement document (e.g., a Consent Decree). There are currently no specific notification requirements specified for either the CGTF or the MRTF aside from what is required by the Safe Drinking Water Act. EPA and ADEQ will work with the Participating Companies to address the issue of notification requirements in the

future.

5 The CIG expressed the opinion that the citizens being served this water should be alerted immediately.

Response: See response to I.C.4. above.

6. The CIG indicated that notification to the stakeholders and the CIG should be made when there are any changes regarding:
   A. Implementation of the ROD Amendment;
   B. Implementation of voluntary actions,
   C. Technology for the CGTF or the MRTF; or
   D. Other remedies being implemented by the PRPs[14] or EPA.

Response: The purpose of this ROD Amendment is to select a final cleanup action that is protective of human health and the environment. EPA is aware that the CIG group is interested in continued interaction between EPA and the community. In the past, EPA has always been responsive to the CIG and that will continue to be the case. If situations arise at the Site that require information to be distributed to the CIG, EPA will make the effort to provide the information. In the recent past, several e-mail messages have been sent to the CIG to provide updated information on the operation of well PCX-1. EPA felt it was important to provide this information and will continue to do so on a case-by-case basis. Anyone on the CIG or in the community can call the 800 number (1-800 231-3075 at any time to ask questions, obtain information, or request a meeting. EPA will continue to honor all reasonable requests for information.

Miller Road Treatment Facility (MRTF)

7. The CIG stated the opinion that the community must have assurances that the treatment malfunction at the MRTF was an isolated incident and that protocols have been put into place so that a reoccurrence does not occur.

Response: EPA has monitored the efforts of the Arizona-American Water Company to investigate and correct their control problem. EPA has conducted technical reviews and provided comments on all of the documents that the Water Company submitted to Maricopa County for approval. EPA will continue to monitor the situation just as EPA monitors the operation of the CGTF. EPA intends to revisit and revise as necessary the operating plans for both the CGTF and the MRTF to reaffirm that all of the necessary controls are in place. At this time, EPA believes that the computer systems that monitor the operations at both plants are the best possible systems to ensure that no incidents occur in the future. However, due to the potential for human and mechanical error EPA cannot provide a 100% guarantee that similar incidents will not occur. What we

[14] The term "PRPs" was included in this written comment received by EPA. "PRP" is synonymous with Participating Companies as defined in this Responsiveness Summary (Response to I.A.2.).

can guarantee is that we will be diligent in our efforts to prevent such incidents and advise the community of any significant developments.

8. The CIG stated the opinion that a protocol must be developed to alert the public immediately so that exposed individuals can have an opportunity to use alternative water sources. It was specifically stated that the PRPs (Participating Companies) need to alert the community via radio, TV and newspapers within hours of an accident.

Response: As indicated in the response to I.C.4. above, EPA and ADEQ will work with the Participating Companies to make sure the issue of notification requirements are addressed in the appropriate future planning documents. At the CIG meeting that was held on March 14, 2001, we talked about a "communication plan" that would outline a strategy for getting information dispersed to the community in the event that a similar event occurred in the future. EPA still believes that this is a good idea. Based on this comment, the ROD Amendment includes a requirement for a Communication Plan that will be subject to EPA approval (see Section XII.B.10 on page 46).

Subsidence

9. The CIG indicated that the subsidence issue had not been resolved. Many CIG members talked about the work that has been done by ADWR to measure subsidence in the area. The opinion was expressed that there should be requirements in the ROD Amendment regarding subsidence monitoring.

Response: Subsidence is a technical issue and it is addressed in detail in Section II of this Responsiveness Summary, page 72. However, some of the CIG's concerns are non-technical in nature and are answered as follows. The ROD Amendment itself does not include requirements specific to documentation of subsidence. EPA's goals in selecting a remedy at NIBW are clearly identified in Section VIII on page 24 (Remedial Action Objectives). The main purpose of this ROD Amendment is to ensure that individuals are not at risk due to exposure to contaminated groundwater.

Because the issue of the potential for subsidence due to pumping groundwater at the Site was raised by the CIG group, EPA researched subsidence as part of our alternatives evaluation. It was never EPA's intention to include subsidence-related measures in the ROD Amendment unless it was determined that there was a direct connection between pumping at NIBW and the potential for subsidence. There is no evidence that such a connection exists. A more detailed response including the technical aspects of subsidence is included in Section II of this Responsiveness Summary (page 72).

10. The CIG indicated that EPA along with the PRPs should evaluate increasing the number of reinjection wells in strategic areas to minimize subsidence and aquifer depletion.

Response: As indicated above subsidence is a technical issue and it is addressed in detail in Section II of this Responsiveness Summary (page 72).

MCL Exceedance

11. The CIG indicated that Maximum Contaminant Level (MCL) exceedances should be based on one single sampling event as opposed to a cumulative average.

Response: Please see discussion of this issue on page 50 (Documentation of Significant Changes, item #4). It is EPA's preference to determine the exceedance of the cleanup standards based on one single sampling event.

The ROD Amendment states that if a cleanup standard is exceeded at any of the treatment plants, EPA and the state will be notified immediately. The Remedial Design Work Plan and the Communication Plan (discussed in the response to #8 above) will establish procedures for resampling, measures that will be taken to ensure that any treatment problems are fixed.

Miscellaneous

12. The CIG indicated that sample analysis should be expedited as opposed to holding the samples in the laboratory for over 24 hours.

Response: As long as samples are properly preserved, storage of samples in the laboratory will not affect the analytical results. Due to laboratory scheduling and the volume of samples coming through a laboratory at any given time, it cannot be guaranteed that samples will always be analyzed within 24 hours. Depending on the sample and the purpose for obtaining it, it may not always be necessary to require expedited results. Because it is significantly more expensive to receive 24-hour or 48-hour results, EPA weighs the importance of each sampling event and determines what samples need to be expedited and what samples don't. It typically takes six weeks to receive sampling results from an EPA-contracted laboratory.

13. The CIG indicated that the ROD Amendment should require EPA to hold regular CIG meetings to update the community on the progress of the cleanup. Some members specified annual meetings others requested semi-annual meetings.

Response: As indicated in Section I.C.6. above, the purpose of this ROD Amendment is to select a final cleanup action that is protective of human health and the environment. EPA is aware that the CIG group is interested in continued interaction between EPA and the community. However, the ROD Amendment is not the appropriate mechanism to require CIG meetings. In the past, EPA has always been responsive to the CIG and that will continue to be the case. EPA will make a sincere effort to hold CIG meetings to provide information on significant milestones regarding cleanup activities at NIBW. In addition EPA will issue fact sheets when appropriate, the first of which will be issued soon after this ROD Amendment is signed by EPA.

Anyone on the CIG or in the community can call the 800 number (1-800-231-3075) at any time to ask questions, obtain information, or request a meeting. EPA will continue to honor all reasonable requests for information.

14. The CIG expressed the opinion that regular written correspondence should be maintained between the EPA and the CIG.

Response: Please see EPA's responses in Sections I.C.6 and I.C.13 above.

15. The CIG stated that the following actions should be taken by EPA.
    A. The MCL for TCE should be lowered from 5 ppb to 1 ppb. According the CIG, one of the reasons for this is that the current treatment technology is capable of treating to less than 1 ppb of TCE or non-detect.
    B. Permissible emissions levels for TCE in air should be immediately reduced by a factor of at least two. Currently, air emissions are permitted to contain 2 lbs/day of TCE. and
    C. EPA (or other appropriate federal agency) should sponsor new research on the effects of TCE ingestion and inhalation to determine, verify, or update the appropriate limits for TCE in air and water.

Response: EPA is sensitive to community concern over "acceptable" TCE levels and the effects of TCE. However, these particular issues cannot be addressed through the issuance of any singular decision document such as the NIBW ROD Amendment. EPA addresses these issues on a national level. Research on cleanup standards for air and water is often conducted for years before such changes are made. EPA's Regional offices (like the San Francisco office that has jurisdiction over the NIBW Site) utilizes the tools that we are given by Congress and EPA HQ to help us make the best decisions on a site-specific basis and to help maintain national consistency for all RODs issued by EPA. These tools include the regulations that establish the groundwater cleanup levels (MCLs) and air emission standards.

16. The CIG requested that EPA coordinate the efforts of the state and federal agencies related to the monitoring of groundwater contamination, water level changes, groundwater pumping and land subsidence in and near the NIBW site.

Response: EPA already coordinates the efforts of the state and federal agencies related to the monitoring of and cleanup activities for groundwater contamination at NIBW. Although EPA will receive and review the data regarding water level changes, groundwater pumping and land subsidence, the ADWR has the lead for monitoring these activities in the state Arizona.

D. Significant questions and comments received from the NIBW Participating Companies in writing during the public comment period

General Comment

1. EPA's cost estimates for the proposed remedy conclude "...the cost of implementing Alternative 3A is anticipated to be the same as implementing Alternative 3." The Participating Companies suggest that certain elements of Alternative 3A will incur additional costs. Until actual final details of some of EPA's proposed requirements are known, these costs cannot be estimated accurately, but they could be significant.

Response: Without knowing what specific elements of the cost of Alternative 3A the Participating Companies are concerned with, EPA cannot provide a response to this comment.

Specific Comments

2. The MRTF and the three associated wells are an integral part of the remedy. There is no realistic alternative to these elements. The Participating Companies have developed binding agreements with both the Arizona-American Water Company (Arizona-American Water Company) and the Salt River Project (SRP), for operation of the MRTF and well PCX-1 as part of the remediation program. The Participating Companies agreement also covers pumping and treatment as needed for wells PVWC-14 and 15. Arizona-American Water Company and SRP have also entered into binding agreements regarding treatment and use of water from well PCX-1.

Response: EPA agrees that the MRTF and the three associated wells are an integral part of the NIBW groundwater remedy. However, Arizona-American Water Company - the owner and operator of the MRTF -- has indicated to EPA on many occasions that they do not believe that the MRTF and associated wells are part of the remedy at all. Arizona-American Water Company has further indicated that they are not interested in signing a consent decree with EPA for the operation of the plant. Unless some entity takes responsibility for operation of the MRTF and these wells in a consent decree with EPA, then these components cannot be part of the final Superfund remedy at NIBW. It is not EPA's preference to abandon the use of the existing equipment. However, Arizona-American Water Company's stance has made using the plant and the wells an unfavorable option to EPA. EPA is aware of the agreements that are in place between the Participating Companies, Arizona-American Water Company and SRP. However, EPA is not a party to these agreements. Therefore, the existence of such agreements does not provide a legal mechanism to ensure EPA's enforcement authority over operation of the Superfund remedy at NIBW

3. Pumping goals should not be linked to remedy requirements. Remedial system pumping schedules should be used in ways that are most beneficial to achieving remedial goals while also meeting water user end-use criteria. Remedial goals

are to control and capture VOC contamination while managing the long-term usability of the regional aquifer. Extraction and treatment strategies have to be flexible to meet remediation objectives. Pumping a fixed volume of water for an open-ended period of time is not an appropriate remedial objective.

Response: Pumping a fixed volume of water for an open-ended period of time is not one of the remedial action objectives. At the time of the first consent decree, a minimum annual average pumping goal was established for the wells connected to the CGTF. These requirements are "goals" and treated as such. The groundwater model that demonstrates capture of the plume at this point in time identified a certain amount of water being pumped from the northern wells. Therefore, minimum total annual average pumping rate goals are identified in the ROD Amendment. EPA evaluates the effectiveness of operating Superfund remedies at least every five years. If it can be demonstrated in the future that plume capture and aquifer restoration can be achieved at a lower rate of pumping and there were no other complicating factors, then the minimum annual average pumping goal may be adjusted accordingly.

4. All extracted water does not have to be treated, and air stripping is not the only treatment technology used at the site. Some pumping of wells that do not show any detectable levels of VOCs is being done now for hydraulic control and plume management (e.g. PVWC-14). Based on current trends and model predictions, TCE concentrations in some wells in the central area are expected to decrease significantly to the point they may be pumped without treatment if water demands continue to require their use. COS-6 is a case-in-point. Although COS-6 has been disconnected from the COS municipal system it has been pumped by SRP for irrigation water supply during the current, severe drought. SRP operates COS-6 (SRP 23.3E-7.5N) without treatment under their general NPDES Permit and confirms that TCE concentrations continue to decrease as evidenced by a level of 1.6 ppb TCE reported in April 2001. Also, new technologies may be developed that prove advantageous (note that the Area 7 treatment plant is planning to use UV-oxidation and ozone destruction of VOCs). Finally, at some time in the future other, more cost-effective technologies might be introduced as conditions change (e.g. use of liquid-phase carbon for treating wells with low VOC concentrations).

Response: EPA agrees that not all water pumped at the Site needs to be treated and the ROD Amendment has been written to reflect this. In Section XII.B. (starting on page 42) the specific wells that will be connected to each of the treatment systems are identified.

EPA agrees that air stripping is not the only technology being used at the Site. The ROD Amendment specifies that UV Oxidation shall be used to treat the extracted water at Area 7 prior to air stripping.

It should be noted that EPA has not approved full scale implementation of the ozone treatment at Area 7. Any new technology that might be discovered after this ROD Amendment has been issued would require a change to this ROD Amendment in order to be implemented at NIBW.

5. MCL violations should not be defined based on exceedance of 5 ppb TCE in a single sampling event. The OU-I Consent Decree standard for the CGTF specifies a 90-day rolling average, and originally contemplated monthly samples. The concept of averaging water quality data over a specified monitoring interval is inherent in regulations derived from the Safe Drinking Water Act and consistent with the purpose of establishing protective water quality standards for chronic exposures. Currently, sampling is to be done weekly for the next two years, then decreasing to a monthly frequency. Monthly sampling is also the current procedure at the MRTF.

   Response actions, as already defined in the various Operations and Maintenance documents for all the existing treatment facilities, will always be undertaken whenever a single effluent sample exceeds 5 ppb TCE. The response actions may include a number of potential operational measures such as verification of plant operational parameters, confirmation of analytical QA/QC, resampling and expedited testing of treated water, adjustment to influent make-up, modification to treatment system processes, or blending of other water sources with treated water

   Response: EPA has considered this comment. Please see Section XII.G.4 on page 50.

   Your comment indicates that the various O&M plans require that "Response actions...will always be undertaken whenever a single effluent sample exceeds 5 ppb TCE". EPA agrees. Details regarding such response actions will be documented in the RDWP.

   It should also be noted that, the treatment technologies at both NIBW treatment plants currently have no difficulty consistently treating the groundwater to below the cleanup standards in Table 3, page 24 of the Decision Summary.

6. Monitoring well data, not periodic model updates, provides the most direct and meaningful measure of remedy performance into the future. The NIBW Site has an extensive monitoring well network and comprehensive database of historical water level and water quality monitoring. The monitoring data represent a far more systematic and reliable indicator of remedy performance than can be obtained using projections from even the most complex and finely calibrated contaminant transport model.

   Response: EPA agrees. The ROD Amendment requires groundwater monitoring to evaluate the effectiveness of the remedy.

7. The NIBW groundwater flow and transport model was developed in the FSA process to evaluate differences between projected remedy performance for a range of extraction and treatment strategies. In the future, it may be instructive to compare model predictions to actual groundwater monitoring data to test our conceptual model and substantiate conclusions drawn from the model for the selected site remedy. Updates to the NIBW model, consisting of input of current pumping data, may be appropriate if there are widespread, negative variations in

model projections compared to future groundwater monitoring results.

Response: EPA believes that inputting current data into the NIBW model will be just one more tool to ensure that the remedy is working effectively. That's why the ROD Amendment requires such input.

8. Source control programs for Area 7 and 12 are intended to reduce local VOC contaminant mass. Under the current remedy and the future plans, these programs concentrate on capturing and reducing the larger concentrations of the observed MAU mass near the original source areas. These programs were never designed to or intended to prevent all VOC migration within the MAU. Overall containment of VOC contamination in the NIBW Site is accomplished by managed pumping of large volumes of contaminated groundwater from extraction wells tied into the CGTF and the MRTF. Thus, the MAU mass outside of the Area 7 and 12 capture zones will be addressed through the regional groundwater remediation program. The source control programs are intended to make major, but not complete, mass reductions and therefore reduce the time required to restore the Site. The complexity of the regional groundwater system makes it certain that not all local concentrations can reasonably be contained at any given location.

Response: The source control programs at Area 7 and Area 12 were implemented as voluntary actions. Your comment indicates that the source control programs in these areas concentrate on capturing and reducing the larger concentrations of the observed MAU mass near the original source areas, so capture was at least considered during the design of these systems. Whether or not these systems were originally designed to maintain capture at Area 7 and Area 12 does not preclude capture from being a requirement of this ROD Amendment.

9. MAU groundwater plumes down gradient of Area 7 and 12 are migrating to the southwest margin and will be addressed through the regional remediation program. Regional pumping stress induces movement of MAU water within the NIBW Site to the southwest margin where it enters the LAU. Consequently, a portion of the MAU plumes beyond the capture zone of MAU extraction wells at both source areas will continue to migrate to the southwest margin. As stated in the preceding comment, the MAU groundwater source control programs are intended to more efficiently extract VOC mass from the regions of larger VOC concentrations that would otherwise move slowly to regional extraction wells. Groundwater monitoring data will provide an on-going mechanism to evaluate and assure attainment of source control program objectives at both Area 7 and Area 12. If source control objectives are not being achieved, contingency measures will be selected and implemented.

Response: No response necessary.

E. Significant questions and comments received from City of Scottsdale (the City) in writing during the public comment period

1. *Water Provider Responsibilities*

As with any CERCLA study area, the principal focus of the NIBW site is, of course, remediation. While the parties focus on these expected Superfund efforts, the City believes simultaneous consideration must also be given to balancing remediation with other ongoing activities within NIBW.

The City is required to meet its varying customer demands for potable water supplies by continually accounting for, treating, and delivering other water supplies, in addition to groundwater sources. These supplies include Central Arizona Project and Salt River Project surface water sources.

The City must also operate its drinking water system, including its operation of the CGTF under the current Consent Decree, subject to the changing requirements of the Safe Drinking Water Act, 42 USCA §§ 300f, *et seq.* The well-publicized primary SDWA standard for arsenic is certain to be revised in the near future. In addition, the presence of inorganic constituents in the NIBW production wells had not been historically documented until water withdrawn from these wells increased with operation of the CGTF. This degradation of water quality by inorganic constituents now requires blending with other sources. As a result, since 1994 the City has been continually monitoring and revising its water production in order to comply with its County approved Nitrate Blending Plan for Sources Supplying Reservoir 80.[15]

The City's goal has been and continues to be providing water of the best quality to its citizens. To that end, the City, in cooperation with the Participating Companies, has contributed hundreds of thousands of dollars in CGTF column improvements over the past few years. As a result, the CGTF now consistently produces water at levels of TCE below detection limits. The City intends to continue to operate the CGTF consistent with the performance level resulting from this commitment.

Neither the City's water quantity nor its water quality concerns is static. In responding to its customers' demands and in meeting its regulatory obligations, the City will likely discover both its immediate and long term needs will not be consistent with current or future NIBW remedial activities. As a municipal water provider, therefore, the City must continue to maintain the flexibility to operate its water system and make decisions as to the sources, quality, and rates of water delivered to its citizens.

Response: EPA is aware of the information provided by the City above.

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[15] As a result, the City has disconnected one high nitrate well that had once been treated at the CGTF. Further, the ability to use well combinations at the CGTF has been drastically constrained- e.g., the primary production wells (Nos. 71 and 75A) cannot be run without additional blending.

However, since the above comments are not direct comments regarding any specific component of the Selected Remedy, no response is required.

2. *Groundwater Management Act*

The activities to be undertaken pursuant to the Proposed Plan should also take into account the City's obligations pursuant to the Arizona Groundwater Management Act (GMA), including securing a one hundred year assured water supply.

For over two decades, the City and other municipal water providers in Arizona have been undertaking efforts to reduce their reliance on pumped groundwater as a water supply. The City presently holds an exemption from minimum groundwater pumping requirements until the year 2025 for the groundwater pumped and treated at the CGTF. Pumping requirements pursuant to a remedy implemented under the Proposed Plan will undoubtedly change, particularly if the groundwater modeling and transport studies are correct and the vast majority of the remaining TCE contamination is removed within the next ten (10) years.

Although the City is currently undertaking a detailed water master planning effort, it is not in a position to identify to what extent the pumping activities anticipated under the Proposed Plan may or will conflict with the City's GMA mandates. This situation underscores, however, that the ongoing pumping requirements of NIBW remedial activities must be considered in the context of the other regulatory constraints on the City as a water provider.

Response: The ROD Amendment requires that the groundwater be pumped to capture the contamination plume. The ROD does not specify a role for the City of Scottsdale. EPA understands that the first Consent Decree includes requirements for the City to, among other things, accept the treated groundwater from the CGTF. The City agreed to these provisions during the negotiations of the Consent Decree.

3. *Other Regulatory Enforcement*

As part of its varied NIBW activities, the City faces regulatory compliance obligations in addition to those imposed by the SDWA and the GMA. The City holds a non-Title V Air Quality Permit issued by Maricopa County for the CGTF off-gas air treatment. The City has also secured from EPA and ADEQ, subject to ongoing monitoring and reporting requirements, an exemption from NPDES permitting to use its Well 25 for irrigation purposes.

In essence, while the potentially responsible parties remain responsible for the ultimate remediation of NIBW soil and groundwater contamination, the City's operation of the CGTF and Groundwater Extraction System is simultaneously subject to the varying regulatory programs and compliance regimes of no less than four state and federal agencies. As a result, the City must emphasize its need to retain authority over operational decisions.

Response: In order to meet the Remedial Action Objectives including treatment of contaminated groundwater to meet drinking water standards, capture of the groundwater contamination plume and aquifer restoration, the CGTF must be operated in compliance with the ROD Amendment.

4. *Aging Infrastructure*

The City must point out that the wells and supporting infrastructure needed for the further implementation of EPA's Proposed Plan are part of an aging system. At fifty years following construction, both Wells No.71 and No.72 have reached the approximate full lifetime of wells in the Valley, and the City has previously provided professional advice that Well No. 71 will immediately require either rehabilitation or replacement. Although the City understands the Proposed Plan is intended to set forth only the general components of a groundwater clean-up remedy, attention must now be given to the specific components themselves and, in particular, the integrity of the Groundwater Extraction System.

Response: The ROD requires capture of the groundwater contamination plume via use of the groundwater extraction and treatment systems. If any of the wells become inoperable for whatever reason, then the wells will have to be rehabilitated or replaced.

5. *Minimum Annual Pumping Goal*

Pursuant to the current OU-1 Consent Decree, the City is obliged to operate the Groundwater Extraction System at a minimum of 6,300 gallons per minute averaged over each calendar year. From the time the City began operating the CGTF in 1994, the City has been able to meet this annual minimum pumping requirement four times. Most recently, production totaled 9,798 acre-feet or approximately 6,074 gallons per minute on the average for the year 2000. As a result, the City was required to request a waiver of the Consent Decree requirements for each of those years in which the minimum pumping rate was not reached.

In its March 1, 2001 comments concerning its review of the Feasibility Study Addendum, the Arizona Department of Environmental Quality recommended the current pumping rate of 6,300 GPM should be a project *goal* as opposed to a mandatory requirement. EPA's Preferred Alternative 3A provides, "The *goal* for minimum total annual average pumping rate will remain at 6,300 gallons per minute for wells located in the central part of NIBW." (Emphasis added.)

The City believes use of the 6,300 GPM figure as a minimum annual pumping goal and not a mandatory requirement reflects the real world conditions the City faces as an operator of the CGTF and a provider of water to its citizens. The City supports use of this goal oriented approach as part of the Proposed Plan and appreciates EPA's recognition of this issue.

Response: No response required.

6. *Remedial Action Objectives*

The Proposed Plan notes that the remedy to be selected within an amended Record of Decision (ROD) or Explanation of Significant Differences (ESD) will be required to meet six stated remedial action objectives (RAOs). The first stated remedial objective is to:

"Remove VOCs from groundwater until drinking water standards for VOCs are met."

The fourth stated RAO provides the actions considered in the Proposed Plan are to:

"Provide a potable water source for the City of Scottsdale."

This fourth remedial action objective is also consistent with Section V Purpose of the OU-1 Consent Decree which provides the project work is intended to control the migration of contaminants and reduce groundwater contamination levels "by providing potable water to the City of Scottsdale."

The 1988 Record of Decision addressed only volatile organic chemicals as contaminants of concern. As noted in the 2000 Feasibility Study Addendum, however, an additional NIBW water quality component includes elevated inorganic constituents (nitrates and total dissolved solids) now identified as present at levels above their respective maximum contaminant levels (MCLs). As a consequence, the City must consistently blend water treated by the CGTF and must also consider additional treatment options in order to meet all of its SDWA requirements.[16]

As noted above, the City has over the past several years attempted to accommodate the severe groundwater withdrawal restrictions established under the State Groundwater Management Act. To the extent possible, the City has attempted to develop surface water supplies whenever feasible. Given this mandate to reduce groundwater pumping, the City typically evaluates a groundwater well as a viable water source both in the context of its value as a non-surface water source and whether additional treatment is needed to bring the well's quality to potable standards.

In the instance of the Groundwater Extraction System incorporated as part of the NIBW Project, the City is presently withdrawing water from wells that- absent any other requirements- the City would likely have phased out because of GMA requirements and the degradation attributed to inorganic constituents. As a result, the City suggests there is a need for any implementation of the Proposed Plan to reconcile the two RAOs of (1) removing VOCs from the groundwater with (2) assurances this treated water will indeed provide a viable potable water

[16] In fact, other than for startup water, all discharges from the CGTF will require additional treatment or blending to meet current Consent Decree requirements or other standards.

Response: See response to I.D.2. above.

2. As indicated above, SRP believes that extraction from PCX-1 should be specified as a requirement in the ROD Amendment.

Response: See response to I.D.2. above.

3. Alternatively, SRP requests that the final remedy require that if PCX-1 ceases to be used that an equivalent amount of water pumping from another source be provided to SRP at the Arizona Canal.

Response: EPA does not have authority over water rights in the state of Arizona. Therefore, EPA cannot provide an alternate source to SRP as requested. The purpose of issuing this ROD Amendment is to ensure that the plume of groundwater contamination does not adversely affect human health and the environment.

4. The Plan calls for treatment of all extracted groundwater using air stripping. This should be clarified to require treatment for all groundwater extracted *as part of the final remedy*. SRP pumps groundwater from clean wells and other wells with low levels of VOCs in the NIBW area according to the conditions set forth in its well system NPDES permit and pursuant to the first NIBW consent decree. These wells do not require treatment.

Response: EPA agrees that not all water pumped at the Site needs to be treated. In Section XII.B. (starting on page 42) the specific wells that will be connected to each of the treatment systems are identified.

5. One of the Remedial Action Objectives in the Proposed Plan is to achieve containment of the groundwater contamination plume by eliminating future migration of the contaminants toward other drinking water supply wells. The Participating Companies developed a groundwater model, presented in the Feasibility Study Addendum, to assist EPA in assessing the capture and containment of the groundwater contamination plumes and in evaluating remedial alternatives. This model uses average annual pumpages based upon historic data and therefore does not take into account the effects of more cyclic pumping patterns (such as extended pumping in drought situations) on plume migration. SRP has the right under the first consent decree to pump its wells in emergency situations such as drought. Under these situations, pumping could potentially impact plume migration. SRP has and will continue to support EPA's remedy by first using the groundwater from remediation sources, such as PCX-1 and Area 12. However, SRP must balance this effort with it's obligations to supply water to it's customers.

Response: EPA must ensure that the NIBW site is effectively remediated and has selected a remedy in this ROD Amendment to ensure that the remedial action objectives are met. In addition, EPA will be conducting ongoing monitoring and five year reviews to ensure that the selected remedy continues to meet the remedial action objectives.

subsidence to occur.

It is common knowledge that groundwater in the state of Arizona has historically been overpumped. Over pumping resulted in the lowering of the groundwater table. By 1991 the groundwater table within the FSA Study Area and adjoining areas had declined by as much as 150 to 300 feet. When too much groundwater is extracted and the water level declines, the water in the spaces between the gravel and sand particles which make up the alluvial fill is removed and the particles, which are under pressure from the land above, settle and compact (Schumann and Associates, 1998). The more the water level declines, the greater the amount of alluvial particles that are exposed to this settling or compaction phenomenon, and the more serious the subsidence is likely to become. It is important to note that once the alluvial fill or sediments have been compacted, they cannot be re-inflated to reverse or undo subsidence (Schumann and Associates, 1998). Another important characteristic of subsidence is that there is usually a substantial delay of 10 years or more between the dewatering of an aquifer and a significant decline in the earth's surface (Schumann and Associates, 1998).

With the decline of agriculture in the Phoenix area, the demand on the groundwater resources also declined. Although a significant amount of groundwater is still extracted for drinking water and other purposes, the groundwater table has recovered in recent years. If subsidence occurs in the NIBW study area it will not be because of current overdrafting of the aquifer(also see response to I.G.1 above). Instead, the cause will be historic depletion of the aquifer. The Selected Remedy will be operated in such a manner to ensure that groundwater sources are not depleted and the potential for subsidence is not exacerbated. The potential for land subsidence should be closely monitored and carefully considered in the planning of future water resource use. The ADWR has committed to a regional program of subsidence monitoring that was initiated in 1999 (ADWR, 1999). The ADWR study will develop the necessary baseline data in the Study Area to verify and quantify any future land subsidence.

As stated above, once the alluvial fill or sediments have been compacted, they cannot be re-inflated to reverse or undo subsidence (Schumann and Associates, 1998). In other words, recharge or reinjection of groundwater from the NIBW site will not reverse the potential for subsidence or prevent subsidence from occurring.

B. Legal Issues: There are no specific legal issues regarding issuance of this ROD Amendment.

Attachment 1 - Description of ARARs for Selected Remedy			
Authority	**Description**	**Status**	**Comments**
Chemical-Specific ARARs			
Federal Safe Drinking Water Act 42 U.S.C. 300g-1, 40 CFR 141.161	Establishes Maximum Contaminant Levels (MCLs) for drinking water supplies.	Applicable	MCLs have been established for a number of common organic and inorganic contaminants. These levels regulate the concentrations of contaminants in public drinking water supplies. The selected remedy will comply with these requirements. The cleanup levels for the VOCs in the aquifer are set at MCLs[1].
Clean Water Act 33 U.S.C 1311-1387	Establishes Water Quality Criteria for surface waters	Relevant & Appropriate	The CWA Water Quality Criteria are designed to protect aquatic life (both marine and freshwater). These standards are expressed on the basis of acute and chronic toxicity levels. The selected remedy will comply with these requirements. Any treated groundwater that is discharged into a surface water body will meet the CWA Water Quality Criteria.
Clean Water Act 40 CFR 402, 405-471; 40 CFR 125	Establishes the National Pollutant Elimination Discharge System (NPDES) Permit Program	Relevant & Appropriate	The NPDES permit program regulates discharges into "waters of the United States" by establishing numeric limits and monitoring requirements for such discharge. The discharge of treated water to Arizona Canal System (when necessary) shall meet the substantive requirements of an NPDES permit.
Location-Specific ARARs			
Clean Air Act 42 U.S.C. 7401 et seq.	Establishes National Ambient Air Quality Standards (NAAQS)	Applicable	NAAQSs are numeric limits for contaminants in air emissions. These requirements apply to all treatment systems that discharge emissions. The selected remedy shall comply with the air discharge requirements of the CAA (NAAQS).

[1] Achievement of MCLs are specifically required for the site-related contaminants identified in Table 3 (Decision Summary).

Attachment 1 - Description of ARARs for Selected Remedy			
Authority	**Description**	**Status**	**Comments**
40 CFR Part 50 and 40 CFR Part 52 Subpart D; AAC § R18-2-201 to 220 and § R-18-2-730 (D) & (G)	Requires compliance with local air standards	Relevant & Appropriate	Any source of criteria pollutants located in an NAAQS non-attainment area must comply with local air quality regulations. NIBW is located in Maricopa County which is a non-attainment area for ozone, carbon monoxide (CO) and particulate matter less that 10 microns in size. The selected remedy will comply with these emissions standards.
A.R.S. § 49-104(11)	Regulates air emissions	Relevant & Appropriate	Air stripping equipment must be operated so that no gaseous or odorous emissions are emitted in concentrations that cause air pollution that is harmful to human health or the environment, cause damage to property, or unreasonably interfere with comfortable enjoyment of life or property. Air stripping units at NIBW must comply with these emissions standards.
Maricopa County Air Pollution Control Regulations Rule 330, § 301	Regulates air emissions in Maricopa County	Relevant & Appropriate	The VOC emission controls must have an overall efficiency of at least 85%. The groundwater treatment systems at NIBW, which are within Maricopa County, shall not emit more that 3 lbs/day of VOCs.
40 CFR Part 265 Subparts AA and BB: AAC § R18-8-265(A)	Regulates air emissions	Relevant & Appropriate	RCRA requirements apply to air emission standards for process vents and equipment leaks associated with distillation, solvent extraction, or air stripping operations. Process vent standards apply to air stripping operations that manage hazardous wastes with organic concentrations of 10 ppm by weight or more. Equipment leak standards apply to equipment that contains or contacts hazardous wastes with organic concentrations of 10% by weight or more. This would be applicable for the NIBW groundwater treatment units if concentrations being treated are 10 ppm or 10% by weight or more.
Resource Conservation and Recovery Act 42 U.S.C. 6901 et.seq. 40 CFR 264.18(a) &(b)	Regulates activities in earthquake zones and 100-year floodplains	Potentially Applicable	A RCRA facility located in areas where earthquakes could occur and 100-year floodplains must be designed, constructed, operated and maintained to prevent damage due to earthquakes or washout of any hazardous waste by a 100-year flood. Since the treatment facilities will generate hazardous waste, any facility constructed within an earthquake zone or a 100-year floodplain shall comply with this requirement.

Attachment 1 - Description of ARARs for Selected Remedy			
Authority	**Description**	**Status**	**Comments**
National Archaeological and Historical Preservation Act 16 U.S.C. 469; 36 CFR Part 65	Protection of archaeological and historical artifacts	Potentially Applicable	Alteration of terrain that threatens significant scientific, prehistoric, historic, or archaeological data may require actions to recover and preserve artifacts. The selected remedy will not alter or destroy any known prehistoric or historic archeological features at or near the NIBW site. The areas in and around NIBW are essentially completely developed. However, because there is always a possibility that buried historic or prehistoric remains could be discovered during construction, this regulation would require action to recover and preserve such artifacts.
Endangered Species Act 16 U.S.C. 1531-1544; 50 CFR Part 200 and 50 CFR Part 402	Protects critical habitat upon which endangered species or threatened species depend.	Potentially Applicable	Requires action to conserve endangered species or threatened species, including consultation with the Department of Interior, Fish and Wildlife Service. There are currently no known endangered species existing at NIBW. However, because there is always a possibility that endangered species could be discovered during implementation of the selected remedy, any action that may impact or threaten the impact an endangered species shall comply with this requirement.
AAC § R18-4-501	Identifies siting requirements for new treatment units	Potentially Applicable	In the event that it is necessary to construct a treatment plant to replace the MRTF, the siting requirements identified in these regulations would have to be complied with.

Attachment 1 - Description of ARARs for Selected Remedy			
Authority	**Description**	**Status**	**Comments**
Action-Specific ARARs[1]			
40 CFR Part 261 and AAC § R18-8-261	Identification and listing of hazardous wastes	Relevant & Appropriate	Establishes procedures and numeric limits for identification and management of characteristic hazardous wastes, listed hazardous wastes, and State-only (non-RCRA) hazardous wastes. These requirements are relevant to management of waste materials generated as a result of construction and operation of the selected remedial action.
40 CFR Section 262.11 and AAC § R18-8-262	Generation of waste from construction & operation due to implementation of remedial action selected	Applicable	Requires waste generators to determine if wastes are hazardous wastes and establishes procedures for such determinations. These requirements are applicable to management of waste materials generated as a result of construction of the selected remedial action or operation of any of the groundwater treatment units at NIBW.
40 CFR § 270	RCRA permit requirements	Relevant & Appropriate	Environmental media containing RCRA listed hazardous waste must be managed as a RCRA hazardous waste. To the extent, if at all, that purge water associated with groundwater monitoring activities contains RCRA listed hazardous waste, then the purge water at NIBW must be managed as a RCRA hazardous waste. The NIBW groundwater itself must be managed as a RCRA hazardous waste due to fact that is contains a RCRA listed waste. Therefore, onsite treatment of the groundwater is subject to substantive requirements of RCRA permits.

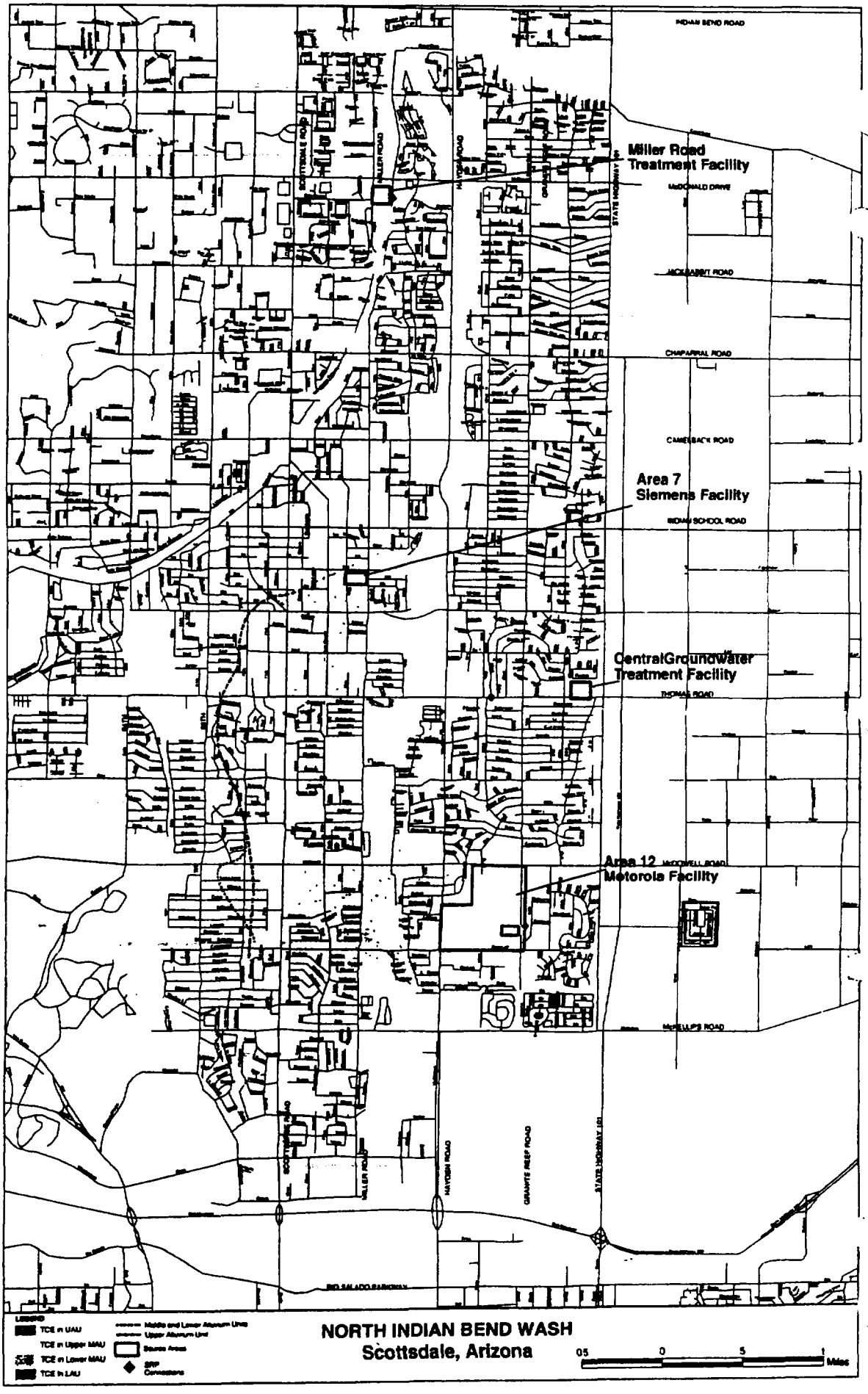
Attachment 1 - Description of ARARs for Selected Remedy			
Authority	**Description**	**Status**	**Comments**
40 CFR Part 264	Establishes standards for owners and operators of treatment, storage and disposal facilities	Relevant and Appropriate	The owners and operators of facilities required by this Remedial Action must comply with the applicable portions of RCRA Part 264. Containers of hazardous waste must be: (1) maintained in good condition; (2) compatible with hazardous waste to be stored; and (3) closed during storage (except to add or remove waste) These requirements would be applicable at NIBW for any contaminated soils or groundwater or treatment system waste that might be containerized and stored onsite prior to treatment or final disposal. If it becomes necessary to verify exceedances of MCLs at any of the NIBW groundwater treatment plants, these procedures shall be used to ensure that the data is accurate and to avoid false negatives or false positives.
40 CFR § 262.34	Regulates Shipment of hazardous wastes for treatment or disposal offsite	Relevant and Appropriate	Specifies maximum amounts and maximum periods for accumulation of hazardous waste onsite under generator status. These requirements are potentially applicable to management of waste materials generated as a result of construction of the remedial action at NIBW and operation of any of the groundwater treatment plants if the waste materials generated are hazardous wastes.
A.R.S. § 49-221: AAC § R18-11-101 *et seq.*	Regulates discharges to surface water	Applicable	Discharge from treatment systems must comply with Arizona State Water Quality Standards for Surface Waters. This requirement is applicable at times when treated water is discharged to surface water (Arizona Canal System).
A.R.S. § 49-222	Provides standards for navigable waters	Relevant and Appropriate	These standards assure water quality for protection of public health and takes into consideration its use and value for public water supplies, the propagation of fish and wildlife, recreational, agricultural, industrial and other purposes including navigation.
A.R.S. § 49-224	Aquifer identification and classification	Relevant and Appropriate	All aquifers in the state identified under § 49-222(A) and any other aquifers subsequently discovered shall be classified for drinking water protected use.

Attachment 1 - Description of ARARs for Selected Remedy			
Authority	**Description**	**Status**	**Comments**
40 CFR Part 122 and Part 125	Regulates discharges to surface water	Applicable	Establishes, treatment and monitoring requirements for discharges to surface water. The substantive requirements of the NPDES program are applicable when treated groundwater is discharged to surface water (Arizona Canal System).
Resource Conservation and Recovery Act 40 CFR 264 (Subpart X): 264.600, 264.601, 264.602, 264.603; AAC § R18-8-264	Establishes requirements for owners and operators of treatment, storage and disposal facilities	Relevant and Appropriate	Miscellaneous treatment units must satisfy environmental performance standards by protection of groundwater, surface water, and air quality, and by limiting surface and subsurface migration. Air stripping towers and soil vapor extraction (SVE) treatment units are considered miscellaneous RCRA units; therefore the substantive portions of these requirements would be applicable in the construction, operation and maintenance and closure of air stripping and SVE units at NIBW.
40 CFR § 144.12 - 144.16	Regulates the reinjection of groundwater	Applicable	Criteria and standards for the Underground Injection Control (UIC) Program. These criteria include current and future use, yield and water quality characteristics and are applicable at NIBW for determining exempt aquifers. Injection wells at NIBW will comply with these design, construction, operation and maintenance requirements.
A.R.S. § 45-454.01	Requirements for wells, groundwater withdrawal, treatment, and reinjection	Applicable	Exempts new well construction, withdrawal, treatment, and reinjection into the aquifer of groundwater that occur as part of a CERCLA Remedial Action from requirements of Arizona Groundwater Code, except that they must comply with the substantive requirements of: ARS 45-594 (well construction standards) ARS 45-595 (well construction requirements) ARS 45-596 (notice of intent to drill a well) ARS 45-600 (filing of log by driller of well)
Arizona Well Spacing and Well Impact Rules AAC § R12-15-830	Regulates the placement of new production wells in the state of Arizona	Relevant and Appropriate	New production wells will not be permitted in the NIBW area that may have an adverse impact on the groundwater remediation systems or hydraulic capture of the contaminated plumes.

AAC § R18-4-502	Identifies minimum design criteria for treatment units	Potentially Applicable	In the event that it is necessary to construct a drinking water treatment plant to replace the MRTF, the minimum design criteria identified in these regulations would have to be complied with.
AAC § R18-4-701 to R18-4-704 and R18-4-706	Identifies requirements for annual consumer confidence reports	Relevant and Appropriate	Requires MRTF and CGTF to comply with the notification requirements in these regulations.

U.S.C. - United States Code
CFR - Code of Federal Regulations
A.R.S. - Arizona Revised Statutes
A.A.C. - Arizona Administrative Code

APPENDIX C


Miller Road
Treatment Facility
Area 7
Siemens Facility
CentralGroundWater
Treatment Facility
Area 12
Motorola Facility
INDIAN BEND ROAD
McDONALD DRIVE
JACKRABBIT ROAD
CHAPARRAL ROAD
CAMELBACK ROAD
INDIAN SCHOOL ROAD
THOMAS ROAD
McDOWELL ROAD
McKELLIPS ROAD
SCOTTSDALE ROAD
MILLER ROAD
HAYDEN ROAD
GRANITE REEF ROAD
STATE HIGHWAY 101
RIO SALADO PARKWAY
LEGEND
TCE in UAU
TCE in Upper MAU
TCE in Lower MAU
TCE in LAU
Middle and Lower Alluvium Units
Upper Alluvium Unit
Source Areas
Well Connections
NORTH INDIAN BEND WASH
Scottsdale, Arizona
0.5
0
5
1
Miles

APPENDIX D

REM IV

Remedial Planning Activities at Selected Uncontrolled Hazardous Waste Sites - Zone II

Environmental Protection Agency
Hazardous Site Control Division
Contract No. 68-01-7251

FINAL
RECORD OF DECISION
SCOTTSDALE GROUND WATER OPERABLE UNIT
INDIAN BEND WASH
SUPERFUND SITE
SCOTTSDALE, ARIZONA

September 1988
RDD63592.RA
Work Assignment 029-9L20.0

CH2M HILL
Black & Veatch
ICF
PRC
Ecology and Environment

CONTENTS

TABLES

CONTENTS
(continued)

I. DECLARATION FOR THE RECORD OF DECISION

SITE

Indian Bend Wash (IBW) Superfund site, Scottsdale Ground Water Operable Unit, Scottsdale, Arizona.

PURPOSE

In accordance with the National Contingency Plan; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); and the Superfund Amendment and Reauthorization Act of 1986 (SARA), potential remedial actions have been developed for the Scottsdale Ground Water Operable Unit. This decision document represents the selected remedial action. The Operable Unit has been developed to provide potable water for the City of Scottsdale and addresses ground water contamination only in the Middle and Lower Alluvium Units beneath the north portion of IBW within the Scottsdale city limits (see Figure I-1). Contamination beyond these limits in the ground water of the Upper Alluvium Unit and in the soils will be addressed separately in subsequent operable units for the IBW site. The Arizona Department of Water Resources and the Arizona Department of Environmental Quality concur with the selected remedy.

BASIS

This decision is based on the administrative record for the IBW site, which includes the results of the Remedial Investigation and the Scottsdale Ground Water Operable Unit Feasibility Study. Appendix A identifies the items contained in the Administrative Record upon which the selection of the remedial action is based.

DESCRIPTION

The IBW study area lies in the southwestern Paradise Valley encompassing approximately 13 square miles in Scottsdale and Tempe, Arizona. The study area is bounded on the north by Chaparral Road, on the east by Pima/Price Road, on the south by Apache Boulevard, and on the west by Scottsdale/Rural Road. The Salt River flows through the study area from east to west, physically separating the site into north and south areas. The area south of the river is suspected to have other source areas than those suspected in the north, and is being considered for a separate operable unit by the U.S. Environmental Protection Agency (EPA).

An Operable Unit is a discrete part of an overall site and can be examined separately if the remedial action for the

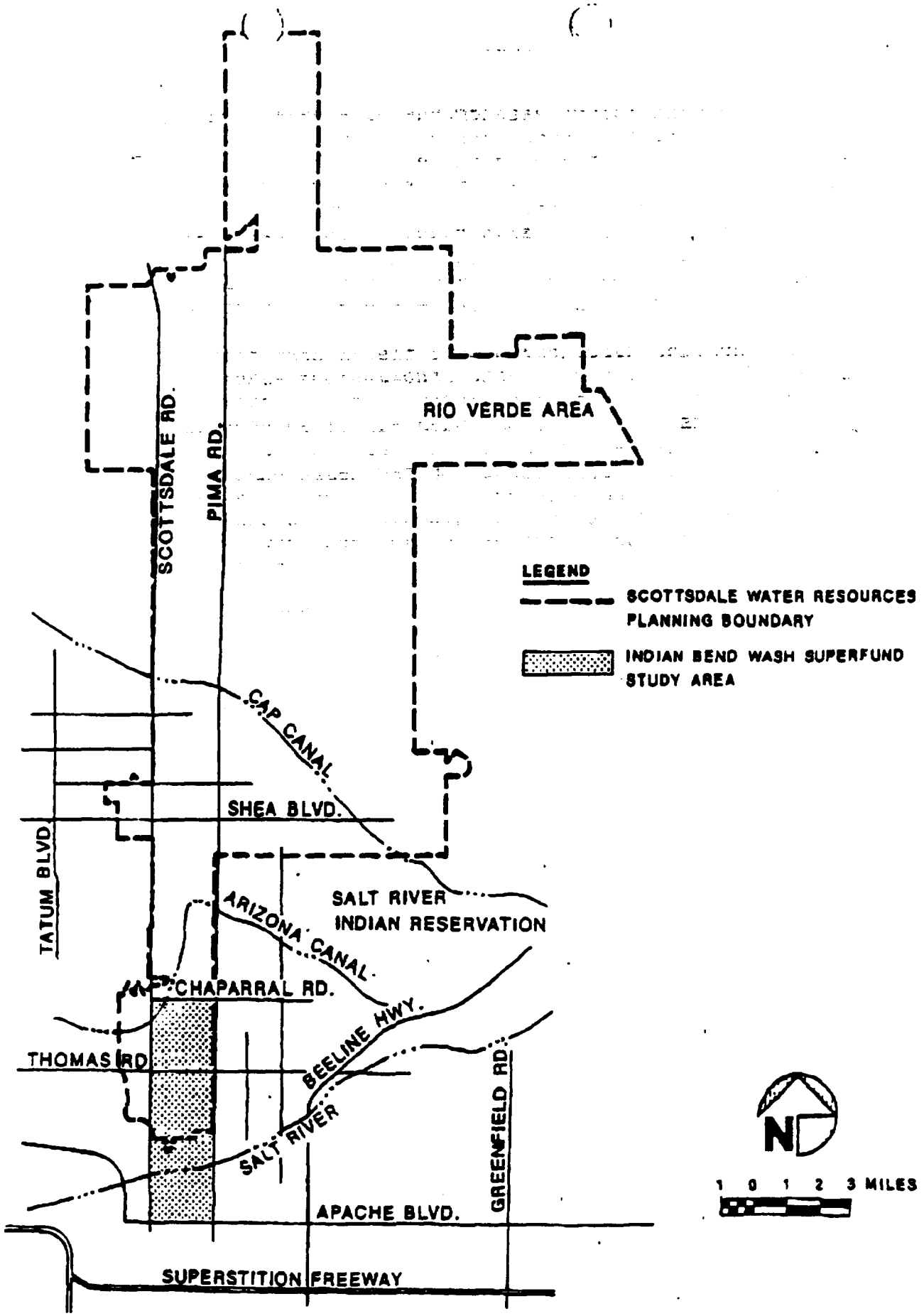


FIGURE 1-1
PROJECT LOCATION MAP

DECLARATION

The selected remedy for this Operable Unit is protective of human health and the environment, meets Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. All substantive permit requirements will be met during implementation of this remedial action. It is determine that the remedy for this Operable Unit uses permanent solutions and alternative treatment technologies to the maximum extent practicable. The Arizona Department of Environmental Quality and the Arizona Department of Water Resources have concurred with the remedy presented in this document.

9.21.88
Date

Daniel W. McGovern
Regional Administrator
Region IX

9.20.88
Date

John W. Wise
Deputy Regional Administrator
Region IX

RECORD OF DECISION
CONCURRENCE PAGE

Site: Indian Bend Wash Superfund Site, Operable Unit, Scottsdale, Arizona

The attached Record of Decision package for the Indian Bend Wash Superfund Site, Operable Unit, Scottsdale, Arizona, has been reviewed, and I concur with the contents.

8/2/88
Date

Nancy J. Marvel
Nancy Marvel
Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency, Region IX

9-19-88
Date

Jeff Zelikson
Director
Toxics & Waste Management Division
U.S. Environmental Protection Agency, Region IX

Date

Harry Seraydarian
Director
Water Management Division
U.S. Environmental Protection Agency, Region IX

Date

David P. Howekamp
Director
Air Management Division
U.S. Environmental Protection Agency, Region IX

Date

Nora McGee
Acting Assistant Regional Administrator
Office of Policy and Management
U.S. Environmental Protection Agency, Region IX

RECORD OF DECISION
CONCURRENCE PAGE

Site: Indian Bend Wash Superfund Site, Operable Unit, Scottsdale, Arizona

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Date

Nancy Marvel
Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection
Agency, Region IX

Date

Jeff Zelikson
Director
Toxics & Waste Management Division
U.S. Environmental Protection
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September 14, 1988
Date

Keith Takata for
Harry Seraydarian
Director
Water Management Division
U.S. Environmental Protection
Agency, Region IX

Date

David P. Howekamp
Director
Air Management Division
U.S. Environmental Protection
Agency, Region IX

Date

Nora McGee
Acting Assistant Regional Administrator
Office of Policy and Management
U.S. Environmental Protection
Agency, Region IX

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Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency, Region IX

Date

Jeff Zelikson
Director
Toxics & Waste Management Division
U.S. Environmental Protection Agency, Region IX

Date

Harry Seraydarian
Director
Water Management Division
U.S. Environmental Protection Agency, Region IX

8/22/89
Date

David P. Howekamp
Director
Air Management Division
U.S. Environmental Protection Agency, Region IX

Date

Nora McGee
Acting Assistant Regional Administrator
Office of Policy and Management
U.S. Environmental Protection Agency, Region IX

RECORD OF DECISION
CONCURRENCE PAGE

Site: Indian Bend Wash Superfund Site, Operable Unit, Scottsdale, Arizona

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Date

Nancy Marvel
Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection
Agency, Region IX

Date

Jeff Zelikson
Director
Toxics & Waste Management Division
U.S. Environmental Protection
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Date

Harry Seraydarian
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Water Management Division
U.S. Environmental Protection
Agency, Region IX

Date

David P. Howekamp
Director
Air Management Division
U.S. Environmental Protection
Agency, Region IX

Sept. 1, 1988
Date

Nora McGee
Acting Assistant Regional Administrator
Office of Policy and Management
U.S. Environmental Protection
Agency, Region IX

II. SITE DESCRIPTION

The Indian Bend Wash site encompasses approximately 13 square miles in Scottsdale and Tempe, Arizona (see Figure I-1). The Scottsdale Ground Water Operable Unit area covers approximately 8 square miles in the southeast portion of the Scottsdale city limits. Approximately 70 percent of the area is classified as residential. Approximately 23 percent is used for commercial and light industrial purposes, with the remaining 7 percent as developed open space. Land use patterns in the area are not expected to change.

The Indian Bend Wash itself runs north/south through the site and supports recreational uses. In the past, the ponds in the Wash were used as a water collection system. The water would eventually discharge to the Grand Canal. After contamination was detected in the surface water of some of the ponds, ground water was no longer discharged to the Wash. Currently, the City of Scottsdale pumps water into the ponds as needed to maintain the surface water for fishing, where allowed, and for the aesthetic qualities it provides to the Wash.

Scottsdale provides water and sewer for most of its residents. The City relies on ground water for approximately 70 percent of its municipal supply, with the additional 30 percent supplied by surface water from the Central Arizona Project.

RDD/R91/002

III. SITE HISTORY AND BACKGROUND

SITE HISTORY

In 1981, trichloroethene (TCE) was discovered in the ground water from several City of Scottsdale and City of Phoenix municipal wells at concentrations exceeding Arizona Department of Health Services action levels in effect at that time. The contaminated wells included City of Scottsdale Wells No. 6 and 31, and City of Phoenix Wells No. 34, 35, and 36 (currently Scottsdale Wells No. 75, 72, and 71, respectively). These wells were removed from potable use. Well No. 6 was equipped by the city with a VOC treatment system and returned to potable use in 1985.

IBW was added to the National Priorities List in 1982, and a Remedial Investigation began in July 1984. The Remedial Investigation is being conducted by EPA in cooperation with private companies and State and local agencies. EPA has identified several facilities within the site boundaries that have records of past use of TCE in their manufacturing processes. Two of these facilities, Motorola and Beckman Instruments, have been identified as Potentially Responsible Parties and are participating in the RI/FS.

The Remedial Investigation has focused on collecting ground water, soil, and soil gas samples for chemical analyses, and defining ground water flow in the study area.

SITE CHARACTERIZATION

The climate of the Scottsdale area is characterized by long hot summers and short mild winters. Climate information for Phoenix, Arizona, indicates the annual average daily temperature is 85°F for the high and 55°F for the low. Precipitation is in the form of rain and averages 7 inches per year. Winds are predominantly from the west at 6 miles per hour (Climates of the States, 1980).

The IBW study area is underlain by alluvial sediments which can be divided into three hydrostratigraphic units. These units consist of the Upper Alluvium Unit (UAU), the Middle Alluvium Unit (MAU), and the Lower Alluvium Unit (LAU). The UAU varies in thickness; however, in the vicinity of the study area, the thickness of the UAU is approximately 120 to 160 feet. The UAU consists primarily of sand, coarse gravel, cobbles, and boulders in this area. Ground water occurs at depths ranging from approximately 90 feet to approximately 130 feet, with up to 40 feet of saturated thickness. The saturated thickness of the unit changes with the time of year, but generally decreases to the north. Ground water in the UAU appears to be flowing in a west-northwest direction.

The MAU primarily consists of silt, clay, and interbedded fine sands. Relatively thin layers of coarser deposits are scattered throughout the unit. Ground water flow in the MAU appears to be toward the north-northwest in the study area. The thickness of the MAU ranges from approximately 360 to 660 feet. Water levels in wells perforated in the MAU occur at depths of 140 to 180 feet.

The LAU is less well defined. Samples collected during monitoring well installation indicate the unit consists of moderately to well-cemented sands and gravel. The depth of the unit is not well defined; however, it is known that the LAU is underlain by the Red Unit which consists primarily of fanglomerate, conglomerate, and sandstone. The direction of ground water flow in the LAU is thought to be similar to that of the MAU.

Water level data indicate that there is a downward-directed vertical hydraulic gradient between the UAU and the MAU and between the MAU and the LAU.

Ground water quality data indicate contamination at IBW from various organic solvents, particularly TCE, tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), and 1,1,1-trichloroethane (1,1,1-TCA). All of these chemicals have been found in monitoring wells at concentrations exceeding State action levels. TCE is the most widespread contaminant with a maximum reported concentration of 2,500 ppb from a UAU monitoring well. The maximum concentration reported from a Middle or Lower Alluvium monitoring well is 700 ppb. TCE has been detected in several municipal wells at concentrations up to 390 ppb and from depths as great as 1,100 feet below land surface.

Six City of Scottsdale wells are affected by VOC contamination including TCE and lower levels of PCE, 1,1-DCE and chloroform. TCE is the only VOC quantified in samples from these wells at levels that exceed primary drinking water standards. As mentioned earlier, six of the seven affected wells are not currently operating and the seventh (City of Scottsdale No. 6) is equipped with a VOC treatment system. Figure III-1 shows the location of the contaminated City wells.

RECEPTORS

ENVIRONMENT

The environment of the Scottsdale area encompassed by the IBW site is primarily residential, commercial, and industrial. There are no unique habitats or threatened or endangered species. Vegetation of the area is typical of residential and industrial areas for that geographic area.

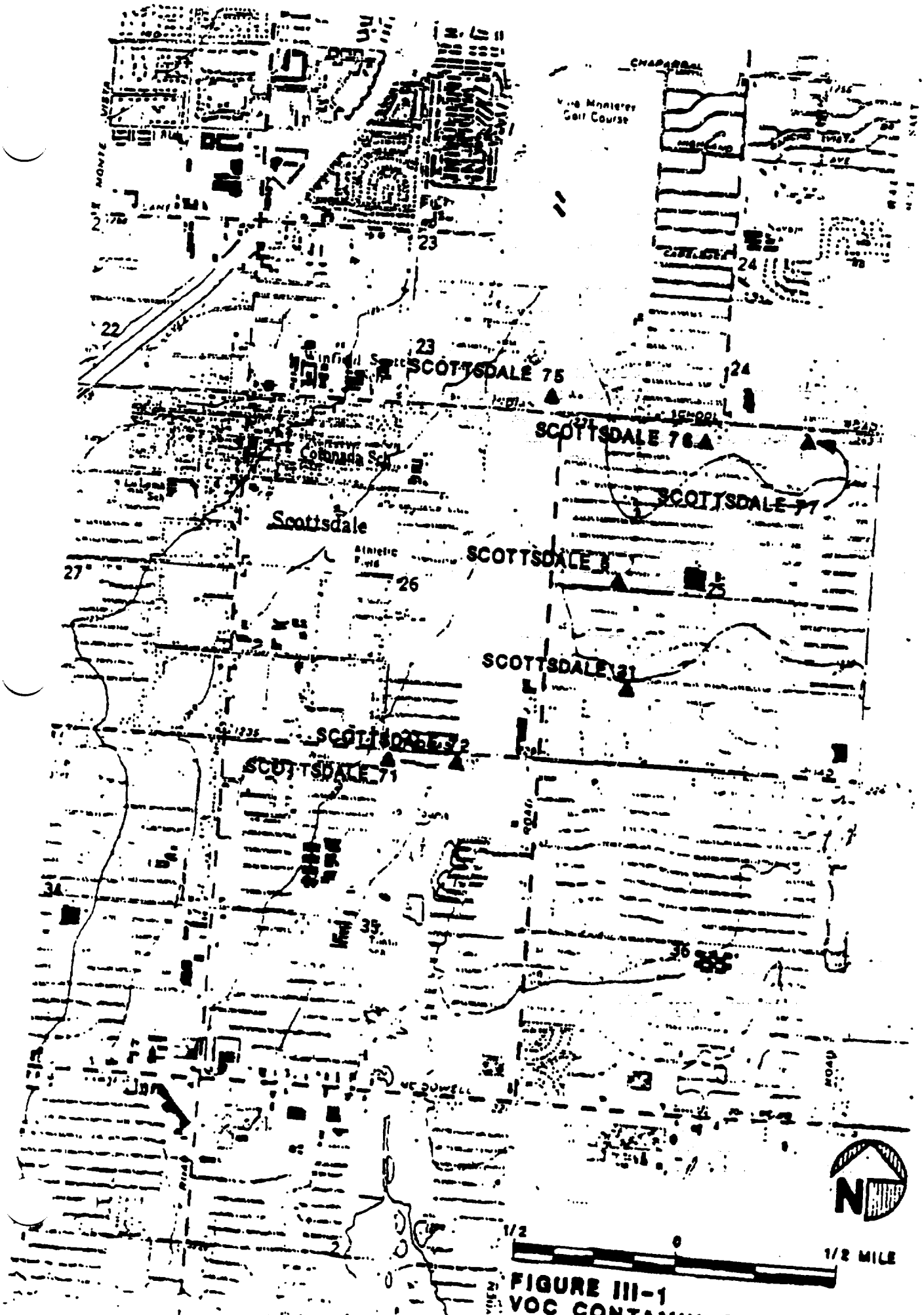

FIGURE III-1
VOC CONTAMINATED

The Indian Bend Wash, which traverses through Scottsdale, supports some wildlife, primarily fish and waterfowl. Some native fish, such as the Gila sucker (Catostomas insignis) and the roundtail chub (Gila robusta) live in the ponds located along the Wash. These ponds also support populations of largemouth bass (Micropterus salmoides) and carp (Cyprinus carpio).

POPULATION

The resident population of Scottsdale was approximately 115,500 in 1986 according to the population projections issued by the City of Scottsdale (1986). By 1990, the resident population is expected to reach an estimated 129,500, and 180,800 by the year 2000 (City of Scottsdale, 1986). Scottsdale also supports a seasonal increase in population; however, this transient population varies from year to year.

All City of Scottsdale drinking water wells currently in use for municipal supply meet applicable Federal and State health standards. However, future population growth will result in greater usage of ground water resources, particularly in the contaminated areas. If no action is taken at this site and contamination migrates to areas that contribute to municipal ground water supplies, use of the ground water will result in a potential exposure to contaminants through the means illustrated in Figure III-2.

TOXICITY

ORGANIC COMPOUNDS

This group of compounds includes most of the contaminants identified at the IBW site. Several of these compounds--carbon tetrachloride, chloroform, 1,1,1-TCA, PCE, and TCE--may produce liver injury. Carbon tetrachloride and chloroform have more serious effects on the liver than TCE and PCE (Doull et al., 1980). Carbon tetrachloride, chloroform, PCE, and TCE have been classified by the U.S. EPA Carcinogen Assessment Group as probable human carcinogens (Group B2) via ingestion (U.S. EPA, 1986).

Exposures to the above compounds through inhalation may result in central nervous system depression, including anesthesia. TCE has been used as an anesthetic (NRC, 1977). Other effects may include irritation of the mucous membranes of the nose and throat and irritation to the eyes (NRC, 1980). TCE and PCE are also classified as probable human carcinogens (Group B2) by the Carcinogen Assessment Group via the inhalation route (U.S. EPA, 1986).

Similar toxic effects to humans through inhalation and ingestion exposures are exhibited by 1,1-DCE. This compound has anesthetic properties, and exposures to high concentrations may cause nausea and vomiting (U.S. EPA, 1985).

RISK

Risk is a function of toxicity and exposure, both in terms of the dose received and the duration of exposure. At present, there is no exposure to contaminated ground water above Federal Primary Drinking Water Standards. However, future use of the City of Scottsdale wells currently not used due to contamination and future migration of the contaminants could affect plant and animal life, and human exposure to the contaminated ground water may result in excess lifetime cancer risks as shown in Table III-1.

The risk associated with exposures to contaminated ground water, particularly for future use scenarios, is an excess lifetime cancer risk that may be as high as 3×10^{-4} to 1×10^{-6} due primarily to the presence of PCE and TCE. This assumes that an individual ingests 2 liters of water daily for 3 months each year over the course of a 70-year lifetime. It is assumed that the 3 months constitute the peak demand months of summer when surface-water supplies may be limited and ground water resources would be necessary. Noncarcinogenic effects resulting from ingestion exposure to 1,1-DCE, PCE, zinc, and lead are of concern.

RDD/R85/002

Table III-1
SUMMARY OF EXPOSURE ROUTES AND RISKS

Medium	Exposure Setting	Exposure Route	Results
Ground water	Residential--Potential Future	Ingestion	The estimated excess lifetime cancer risk from ingestion of ground water from the Beckman monitor wells presents a 1×10^{-5} to 7×10^{-9} range of additive risk for organic contaminants. A 1×10^{-3} excess lifetime cancer risk was calculated for arsenic; the MCL of 50 µg/l for arsenic was not exceeded in this well. The daily intake of lead resulted in a daily intake that exceeded the AIC for the 18- to 70-age category. At this time, the lead found in the ground water sample is not believed to be the result of disposal activities in the area. The concentration of lead did not exceed the MCL of 50 µg/l. For other noncarcinogens evaluated, there does not appear to be an ingestion risk based on the limited available data. For the various municipal wells evaluated, an estimated excess lifetime cancer risk from ingestion presents a 1×10^{-6} to 6×10^{-9} range based on the organic contaminants with cancer potency factors. A 1×10^{-3} excess lifetime cancer risk was calculated for arsenic; however, the MCL of 50 µg/l was not exceeded for any of the wells. There is no known ingestion risk due to noncarcinogens from these wells based on the limited available data. The estimated excess lifetime cancer risk from ingestion of ground water from the EPA

Table III-1
(continued)

Medium	Exposure Setting	Exposure Route	Results
			monitor wells presents a 7×10^{-5} to 2×10^{-6} range of additive risks for organic contaminants. For noncarcinogens, the acceptable intake or the hazard index were exceeded for the following contaminants and wells: o E-1NA: zinc; 0 to 6 years, AIS; 6 to 11 years, AIS; 18 to 70 years, AIC. o E-2UA: lead, chromium; 18 to 70 years, hazard index. For other noncarcinogens evaluated, there does not appear to be an ingestion risk, based on the limited available data. The estimated excess lifetime cancer risk from ingestion of ground water from the Motorola monitor wells presents a 3×10^{-4} to 2×10^{-7} range of additive risks for organic contaminants. A 3×10^{-3} excess lifetime cancer risk was calculated for arsenic; however, the MCL was not exceeded. For noncarcinogens, the acceptable intake or the hazard index were exceeded for the following contaminants and wells: o M-4UA: 1,1-dichloroethene, perchloroethene; 18 to 70 years, hazard index. o M-5UA: 1,1-dichloroethene, perchloroethene; 18 to 70 years, hazard index.

IV. ENFORCEMENT HISTORY

In the Indian Bend Wash area, Motorola, Government Electronics Group (Motorola) and Beckman Instruments, Inc. (Beckman), have received general notice letters compelling their involvement in the Remedial Investigation/Feasibility Study (RI/FS).

The efforts expended by both companies have been investigatory in nature and include such activities as source investigation and ground water monitoring. A history of the administrative orders follow:

Docket Number	Company	Authority
84-01	Motorola	RCRA-3013
84-04	Beckman	RCRA-3013
86-06	Motorola	CERCLA-106
87-05	Motorola	CERCLA-106

Both companies are continuing to participate in the RI/FS. These specific activities include conducting monthly water level measurements, sampling ground water wells quarterly, installing ground water monitoring wells, and conducting other field activities to determine the extent of soils and ground water contamination.

RDD/R85/018

COMMUNITY RELATIONS HISTORY

The following is a list of community relations activities conducted by the U.S. Environmental Protection Agency at the Indian Bend Wash Superfund site:

- Conducted interviews with Phoenix, Tempe, and Scottsdale residents and State and local officials to improve the Agency's understanding of community concerns. These interviews provided the basis for the Indian Bend Wash Community Relations Plan released in September 1984.

- Established information repositories at the Arizona Department of Health Services, Phoenix Public Library, Scottsdale Public Library, and Tempe Public Library. Updated repositories periodically with factsheets and other relevant documents.

- Publicized and maintained a toll-free information message line to enable interested residents to call EPA with questions and comments on the Indian Bend Wash Superfund site activity.

- Established and maintained a computerized mailing list with more than 200 names and addresses of interested individuals.

- In July 1984, distributed a letter and factsheet announcing startup of RI/FS activities. A public meeting was held in August 1984 to provide an overview of the Superfund process and to inform interested community members of upcoming RI/FS activities.

- Sent out a factsheet in February 1985 to update the community on RI/FS and enforcement activities.

- In July 1986, distributed a factsheet informing the community about the completion of the Phase I Remedial Investigation Report and other site-related activities including the community well sampling program and the lake and fish sampling program.

- Held a community meeting in August 1986 to update the community on site activities, present the results of the Remedial Investigation Phase I Report, and discuss future RI/FS activities. Approximately 30 people attended this meeting.

- In April 1988, distributed a factsheet informing the community about the cleanup alternatives described in the Operable Unit Feasibility Study (OUFS) and EPA's proposed partial cleanup remedy for Scottsdale's drinking water aquifer.

- Placed public notice advertisements in the Scottsdale Progress and the Phoenix Gazette newspapers announcing the proposed plan and the May 5, 1988, community meeting. Advanced notice flyers were mailed to the site mailing list 2 weeks before the start of the comment period.

- Held a public comment period on the cleanup alternatives evaluated in the OUFS. The comment period extended from April 19 through May 18, 1988.

- Held a community meeting on May 5, 1988, to discuss the OUFS report and EPA's proposed cleanup solution and to accept public comments on the proposed plan. The meeting was attended by approximately 25 persons.

RDD/R4/019

VI. ALTERNATIVES EVALUATION

LISTING OF ALTERNATIVES

The alternatives identified for the Scottsdale Ground Water Operable Unit are broken into two categories: containment alternatives and treatment alternatives.

Containment alternatives were selected to prevent migration of contamination in the aquifers and to mitigate present and future environmental damage. Treatment alternatives were selected based on their ability to remove VOCs from water. Since a major objective of the Scottsdale OUFS is to provide potable water for use by the City of Scottsdale, the water end use is fixed.

CONTAINMENT ALTERNATIVES

The Middle and Lower Alluvium Units have been chosen for remedial action as part of this Operable Unit. These are the units in which the affected wells are screened and serve as a source of potable water to the City of Scottsdale. The Upper Alluvial Unit remedy will be decided in a subsequent Operable Unit. The following containment alternatives were developed for the Scottsdale Ground Water Operable Unit.

- P.0--No action alternative
- P.1--Pumping of existing city wells at their historical capacities
- P.2--Pumping of existing city wells at 75 percent of their historical capacities
- P.3--Pumping of some city wells and addition of three new wells to optimize the aquifer area affected
- P.4--Pumping of city wells for 10 years and subsequent addition of three new wells to optimize the aquifer area affected

Construction of a containment barrier is inappropriate in this case due to the depth of alluvial units, and it does not satisfy the preference under SARA to permanently and significantly reduce the volume of hazardous substances.

TREATMENT ALTERNATIVES

The following options were considered for removal of low concentrations of VOCs from aqueous solutions:

The four remaining pumping alternatives were evaluated by modeling ground water and transport flow within the affected alluvium units. Table VI-1 summarizes the percentage of TCE estimated to be removed from the aquifer following pumping for various periods. The percentage removed is based on initial mass estimates of TCE and results of the transport flow model presented in the OUFS.

Table VI-1
PERCENT TCE REMOVED

	5 Years	25 Years	50 Years
P.0	6	25	44
P.1	7	45	85
P.2	9	42	79
P.3	6	40	83
P.4	7	41	90

The results indicate that Alternatives P.1 and P.4 are the most effective at reducing amounts of TCE over a 50-year period. However, Alternative P.2 is more effective over a period of 5 to 25 years. It is expected that during operation of the extraction system, changes would be required to optimize the system. These changes are impossible to define at this time.

In addition to being compatible with all the treatment options, P.1 uses only existing wells and appears to be as effective as the remaining options. Therefore, it was chosen for developing system capacities and water quality design criteria to evaluate the treatment options.

TREATMENT ALTERNATIVES

Table VI-2 presents an evaluation of the technologies for VOC removal and screens out those not considered applicable. The water quality design criteria are based on TCE, chloroform, 1,1-DCE, PCE, and 1,1,1-TCA. Air stripping and activated carbon adsorption were retained for the detailed evaluation. The other technologies were dropped from further consideration for a variety of reasons including poor, variable, or unproven performance, institutional and management constraints, or inappropriateness for expected contaminant concentrations.

Table VI-2
SCREENING OF VOC REMOVAL TECHNOLOGIES

Process Description	State of Development	Treatment Capability	Performance Record	Relative Costs		Waste Streams	Additional Comments	Retained for Further Analysis
				Capital	Operation			
Air Stripping	Commercial	Capable of achieving high VOC removal	Excellent	Low	Low to Moderate	Air exhaust (can be treated)	Commonly used for removal of VOCs at low concentrations.	Yes
Steam Stripping	Commercial	Capable of achieving high VOC removal	Excellent	Moderate	High	Small air exhaust, condensate with organics	Not typically used for this type of application.	No--Not well demonstrated for cost removal of low concentrations of VOCs. Much higher energy requirements than air stripping without any significant advantages.
Activated Carbon Adsorption	Commercial	Capable of achieving high VOC removal	Excellent	Low to Moderate	Moderate to High	Carbon with adsorbed organics requires periodic regeneration or replacement	Cost-effectiveness is sensitive to carbon usage rate.	Yes--Useful for vapor and aqueous-phase VOC removal.
Reverse Osmosis	Commercial	Relative poor performance for VOCs	Poor for VOC removal	High	High	Produces a concentrate stream that requires additional treatment	Generally used for removal of dissolved inorganics and high molecular weight organics.	No--Poor performance for VOC removal.
Aerobic Biological	Commercial	Some compounds not readily biodegradable	Variable performance for VOCs	High	High	Sludge requires disposal	May not be stable, susceptible to shock, temperature-dependent; acclimation is important.	No--Variable performance.
Anaerobic Biological	Commercial	May not consistently meet standards	Variable performance for VOCs	High	High	Sludge produced	May not be stable, susceptible to shock, temperature-dependent; acclimation is important.	No--Variable performance.

Table VI-2
(continued)

Process Description	State of Development	Treatment Capability	Performance Record	Relative Costs		Waste Streams	Additional Comments	Retained for Further Analysis
				Capital	Operation			
Chemical Oxidation	Commercial	Capable of achieving high VOC removal	Applicable to low concentrations	High	High	CO_2 plus byproducts	High power requirements, oxidants may be toxic. Potential for toxic breakdown products to be formed.	No--Not demonstrated for large-scale application. Further analysis is required regarding the potential formation of general oxidation products prior to application in large drinking water systems. The process may be feasible for smaller capacity systems, particularly where VOC concentrations are relatively high and a nonpotable water use is specified.

Source: City of Scottsdale, Operable Unit Feasibility Study for Remediation of Groundwater in the Southern Scottsdale Area. Prepared by Malcolm Pirnie. April 1988.

Chapter 3 of the Scottsdale OU of Ground Water Treatment Remedial Technologies for Indian Bend Wash, prepared in September 1987, provides more detail on the screening process.

EVALUATION OF ALTERNATIVES

GROUND WATER ALTERNATIVES

P.0 No-Action Alternative

The no action alternative would allow contaminated ground water to spread over a widening area and, in light of the proposed increased usage of ground water in the area, cause adverse environmental and health consequences.

Pumping of Ground Water

Each pumping alternative (P.1 through P.4) is potentially feasible and satisfies the objectives of CERCLA and SARA by reducing the amount of contamination in the Middle and Lower Alluvium Units. They also satisfy the objectives of the OUFS in stopping contaminant migration and supplying a source of water for the City of Scottsdale.

TREATMENT ALTERNATIVES

Both air stripping and activated carbon adsorption achieve the desired goal of reducing volume and toxicity of the ground water sufficiently to meet the applicable and appropriate requirements and will likely exceed these requirements. Table VI-3 presents the treatment goals and water quality design criteria. Treatment of contaminated ground water, either by air stripping or the use of granular activated carbon, has been shown to be very effective, with removals of organics often exceeding 99.9 percent. These processes are relatively predictable, and they have been used successfully at a number of CERCLA sites.

The air stripping and adsorption facilities will require operator attention for periodic monitoring, maintenance inspections, and water sampling. With industrial grade components and regular preventive maintenance, process integrity should be 25 years or more. If periodic cleaning of the packing and internals due to scaling becomes necessary, provisions for adding antiscalant will be made during the preliminary and final design phases.

Neither of the treatment alternatives will require unusual construction materials or practices. It is estimated that either facility could be designed and constructed in 18 to 24 months.

VII. SELECTED REMEDY

DESCRIPTION

Presently, the preferred alternatives for the Scottsdale Ground Water Operable Unit are:

Containment Alternative--Ground water will be extracted from the Middle and Lower Alluvium Units by pumping City of Scottsdale Wells No. 31, 71, 72, and 75 at a minimum of 75 percent of their historical capacities (P.2). This alternative is chosen because it utilizes existing wells and appears to be the most effective for reducing the amount of TCE during the first years of operation (See Table VI-1). Once the system is operating and the effectiveness of removing VOCs from the Middle and Lower Alluvium Units can be further evaluated, additional pumping of these wells (up to 100 percent of their original capacities) and the use of additional extraction wells will be considered. The pumped water will be sent to the City of Scottsdale water system for potable use after contaminant levels are reduced to meet primary drinking water standards.

Treatment Alternative-Air Stripping with Air Emission Controls--The extracted ground water will be sent through a collection system to a centralized treatment facility. Air stripping will be used since all of the contaminant levels can be lowered to meet drinking water standards at a lower cost than by using granular activated carbon. Specifically, packed column aeration will be used in which the water passes over the packing material by gravity. Air is forced upwards through the column to provide a counter-current flow. The VOCs are transferred from the water to the air and exhausted at the top of the columns. Vapor phase GAC adsorption will be used to remove VOCs from the air waste stream from the treatment plant.

End Use--To completely satisfy the objectives of the Operable Unit, the end use will be distribution to the City of Scottsdale water system. Any recharge project proposed by the City of Scottsdale will be evaluated for any adverse impact on the Operable Unit.

After 50 years of operation, the chosen alternative is estimated to remove between 79 and 85 percent of the present mass of TCE in the Lower and Middle Alluvium Units. This remedy will provide potable water to the city while utilizing existing facilities, improve the regional aquifer's suitability for potable use by removing contaminants, and protect public health and the environment by protecting unaffected wells from VOCs. It also fulfills the statutory preference for permanent solutions at Superfund sites.

Present worth cost estimates for the pumping and air stripping treatment alternative are presented in Table VII-1. Costs include piping and treatment equipment, maintenance, regeneration of vapor phase GAC, and engineering and design. The estimates are based on a system capacity equal to the historic pumping capacities of Wells 31, 71, 72, and 75 (8,400 gpm) and the treatment goals in Table VII-2. If the MCLs for the VOCs or other constituents such as heavy metals are changed, the remedy will be reevaluated to determine if a design modification is necessary. Cost estimates were initially developed for two alternatives within the air stripping alternative. One considered stainless steel columns with circular cross sections, and the other considered concrete columns with rectangular cross sections. The estimates presented in Table VII-1 are based on the concrete columns, which is the preferred design.

STATUTORY DETERMINATIONS

CERCLA, and its reauthorization, SARA, requires that permanent reductions of contaminants through treatment be preferred over containment alternatives. It also requires that Applicable or Relevant and Appropriate Requirements (ARARs) be used to determine the treatment levels. By achieving these requirements, the selected remedy for the Scottsdale Ground Water Operable Unit reduces the present and future risks associated with use of the ground water in the Scottsdale area. By reducing the contaminant levels and restricting their mobility, this remedy protects both human health and environmental quality.

Table VII-2 shows the ARARs identified for the ground water and the proposed treatment goals. Contaminant levels found in the IBW wells are greater than the Safe Drinking Water Act maximum contaminant levels and the Arizona Department of Health Services action levels.

Table VII-1
PRELIMINARY COST ESTIMATES--PRESENT WORTH ANALYSIS
PACKED COLUMN AERATION WITH VAPOR-PHASE GAC AND
PUMPING OF EXISTING WELLS

Total Capital Cost	$4,008,000
Annual Operating Cost	520,000
Present Worth of Operating Costs at 10 percent	4,720,000
Total Present Worth at 10 percent	8,728,000

Notes: System capacity = 8,400 gpm.
Present worth factor is based on an annual interest rate and 25 years of operation.

The selected remedy satisfies the requirements for treatment and risk reduction, and does so economically. Initial analysis of the pumping regimen indicates the volume of contaminated ground water and mass of VOCs will be reduced.

Of the proven technologies, air stripping proved to be the most economical treatment method available, both for capital and operating costs. It will also reduce residual wastes to a minimum.

Distribution of the treated water to the City of Scottsdale water system is the only end use that will satisfy the objective of providing a potable water source to the City. The selected remedy satisfies the requirement of reducing the mobility, toxicity, and volume of contaminated water. It does so by using treatment technology to the maximum extent practicable and does so in a cost-effective manner.

Table VII-2
STATE AND FEDERAL
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS[a]
AND OTHER CRITERIA
(concentrations in ppb)

Compound	SDWA MCL	SDWA MCLG	ADHS Action Level	Treatment Goal
Trichloroethene	5	0	5	5
1,1,1-Trichloroethane	200	200	200	200
1,1-Dichloroethene	7	7	7	7
Perchloroethene			1	0.67
Chloroform[b]			3	0.5

[a] Clean Water Act requirements will be determined during NPDES review.

[b] Source is not a byproduct of municipal water supply chlorination.

Notes: ADHS--Arizona Department of Health Services
AWQC--Ambient Water Quality Criteria
MCL---Maximum Contaminant Level
MCLG--Maximum Contaminant Level Goal
SDWA--Safe Drinking Water Act

Sources: U.S. EPA 1986. Public Health Assessment Manual
ADHS 1987. S. Eberhart

VIII. REFERENCES

City of Scottsdale, Arizona. August 1986. Population Projections, 1986-2010. Growth and Development Report, Planning and Economic Development.

Climates of the States. 1980. Second Edition, Vol. I, Detroit, Michigan: Gale Research Company.

Doull, J., C. D. Klaassen, and M. D. Amdur. 1980. Toxicology. MacMillan.

NRC (National Research Council). 1980. Drinking Water and Health. Vol. III. Washington, D.C.

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U.S EPA. 1986. Superfund Public Health Evaluation Manual. Washington, D.C.: Office of Emergency and Remedial Response, Office of Solid Waste and Emergency Response.

U.S. EPA. 1985. Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites. Final Report. Washington, D.C.: Office of Waste Programs, Enforcement, Office of Solid Waste and Emergency Response.

RDD/R48/012

Appendix A
INDEX OF ADMINISTRATIVE RECORD

March 1984 Ecology and Environment, Inc.

Review of Chemical Characterization of Soil from the Chemical and Electronic Shop Disposal Line Break at Motorola. Motorola, Inc. Government Electronics Group. March 27, 1984.

Reviews report of leak in Motorola wastewater effluent line by Dr. Wallace Fuller (Motorola consultant).

June 1984 Ecology and Environment, Inc.

Final Work Plan RI/FS Indian Bend Wash Site. Phoenix, Arizona. June 1984.

Describes the activities to be carried out and the methodology for the Remedial Investigation and Feasibility Study of the Indian Bend Wash area.

July 1984 Ecology and Environment, Inc.

Sample Documentation Report Indian Bend Wash. Remedial Investigation. Scottsdale, Arizona. July 2, 1984.

Discusses the well sampling effort performed during the weeks of October 29 and November 3, 1984, throughout the IBW study area.

September 1984 Ecology and Environment, Inc.

Final Community Relations Plan. Indian Bend Wash. Phoenix, Arizona. September 1984.

Prepared as part of Phase I of the RI/FS to provide a means of gathering background, site history, and a discussion of the concerns of interested parties.

November 1984 Ecology and Environment, Inc.

Quality Assurance Project Plan. Indian Bend Wash and Phoenix-Litchfield Airport Area Sites. November 1984.

November 1984 ( )ntinued)		Describ procedures for ensuring quality control and reliability of sampling procedures, field measurements, equipment maintenance, analytical procedures, data management, and document control.
February 1985	Errol L. Montgomery and Associates, Inc.	Phase II Results of Motorola Inc. Hydrogeologic Investigations On-site Monitor Wells. Motorola Inc. Government Electronics group. Scottsdale Plant, Maricopa County, Arizona. February 22, 1985. This report provides results of hydrogeologic investigations conducted at the Motorola Inc. Scottsdale plant.
November 1985	Errol L. Montgomery and Associates, Inc.	Phase I Off-site Results of Motorola Inc. Hydrogeologic Investigations Phase I Off-site Monitor Wells. Motorola Inc. Government Electronics Group. Scottsdale plant. Maricopa County, Arizona. November 21, 1985. This report provides results of Phase I hydrogeologic investigations conducted in the Indian Bend Wash Area.
March 1986	The Mark Group	Hydrogeology Report (Former) Beckman Instruments, Inc. Site. Scottsdale, Arizona. March 21, 1986. Provides results of soil and soil gas sampling and analysis, monitor well construction and sampling, theoretical analysis of trichloroethene transport, and interpretation of both onsite and offsite data at the former Beckman site.

May 1986	Ecold and Environment, Inc.	Draft Ph I Task Report. Indian Bend Wash. Remedial Investigation. Scottsdale, Arizona. May 19, 1986. Defines the ground water flow patterns in the study area, determines the vertical and lateral extent of ground water contamination, estimates the volume of ground water impacted, determines potential sources of contamination, and obtains data for use in the Feasibility Study.
December 1986	U.S. EPA	Interim Guidance on Superfund Selection of Remedy. December 24, 1986. Provides new guidance on the selection of remedial actions in the absence of a new edition of the NCP. Incorporates Superfund Amendments and Reauthorization Act of 1986 (SARA).
July 1987	U.S. EPA	Interim Guidelines on Compliance with Applicable or Relevant and Appropriate Requirements. July 9, 1987. Provides new guidance on selection of ARARs and MCLs as cleanup standards for Superfund sites. Incorporates SARA.
August 1987	Black and Veatch	Soil Sampling Plan. Indian Bend Wash, RI/FS. August 10, 1987. Describes the objectives of the investigation of the vadose zone at Indian Bend Wash.
September 1987	CH2M HILL	Evaluation of Groundwater Treatment Remedial Alternatives. Indian Bend Wash. September 9, 1987.

		Describes and evaluates groundwater treatment technologies and provides order-of-magnitude costs for those discussed.
October 1987	CH2M HILL	Evaluation of Potential Water Use Alternatives. Indian Bend Wash. Remedial Investigation. October 16, 1987. Presents an evaluation of potential water user alternatives near the IBW site if ground water is extracted and treated.
November 1987	Errol L. Montgomery and Associates, Inc.	Results of 10-Day Middle Alluvium Unit Aquifer Test February-March 1987. Motorola Inc., Government Electronics Group. Scottsdale, Arizona. November 20, 1987. This report gives the results of a 10-day aquifer test at pumped Well (A-1-4) 1abb1 [SRP 23.6E, 6N] in the Indian Bend Wash area.
December 1987	CH2M HILL	Groundwater Field Sampling Plan Phase II/Stage 2 Remedial Investigation. Indian Bend Wash Site. Scottsdale, Arizona. December 1987. This scope of work discusses the installation and testing of six new monitoring wells at Indian Bend Wash site.
February 1988	CH2M HILL	Technical Memorandum Soil Gas Results. Indian Bend Wash RI/FS. Scottsdale, Arizona. February 5, 1988. Discusses soil gas sampling and mobile analysis conducted at the IBW Superfund site during February 1987, June 1987, and December 1987.

April 1988 City of Scottsdale, Arizona — Public Comment Operable Unit Feasibility Study for Remediation of Groundwater in the Southern Scottsdale Area. Malcolm Pirnie. April 1988.

Discusses, screens, and evaluates remedial actions for providing an expedited cleanup of the Scottsdale Operable Unit.

RDD/R32/016

Appendix B
RESPONSE SUMMARY

Appendix B
RESPONSE SUMMARY

OPERABLE UNIT FEASIBILITY STUDY (OUFS) FOR REMEDIATION OF GROUNDWATER IN THE SOUTHERN SCOTTSDALE AREA

OVERVIEW

During the public comment period for the April 1988 OUFS (Draft for Public Comment) from April 19 through May 18, 1988, EPA received comments on the recommended partial remedy for ground water at the Indian Bend Wash (IBW) area. Comments were received from State regulatory agencies and from businesses presently or previously located in the IBW area. EPA also received comments from the general public at its Public Meeting held May 5, 1988, at Scottsdale City Hall.

Most of the comments received were of a technical nature. Substantial technical comments are responded to herein. None of the comments raised issues that would affect EPA's selection of a partial remedy or require reissuance of a revised OUFS. Therefore, the April 1988 Public Comment OUFS, along with clarification provided by this Response Summary, shall constitute the Final OUFS for this project.

SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

GENERAL COMMENTS

From Arizona Department of Water Resources; Arizona Department of Environmental Quality

1. Concerns were expressed regarding the level of detail in discussions of ground water pumping alternatives, new water quality data obtained for Scottsdale Well No. 76, and the limitations of analysis results obtained from the two-dimensional ground water model utilized.

RESPONSE: The purpose of the two-dimensional model is to evaluate the feasibility of various pumping regimens to achieve the remedial action objectives for ground water stated in the OUFS: (1) to protect unaffected wells from VOCs, and (2) to improve the regional aquifer's suitability for potable use. Although the two-dimensional model is more simplistic than a properly constructed and operated three-dimensional model, the two-dimensional model adequately considers the hydrogeologic conditions, and the projections are suitable to evaluate the feasibility of pumping to achieve the

ground water r(diation objectives of t OUFS. Additional detailed modeling may refine the understanding of the complex hydrogeologic system; however, a higher degree of detailed modeling is not required for the purposes of the OUFS. It should be noted that the Operable Unit remedy is designed to be a partial remedy, and additional modeling and consideration of other potentially feasible pumping alternatives will be considered in the overall FS for the IBW area. Acquisition of new water quality data and further work with ADWR's three-dimensional model is encouraged, and new available data should be used, when appropriate, to propose modifications to the remedial action program to more effectively achieve the objectives of the remedy.

Results of computer modeling cannot be regarded as absolute and must be considered using professional discretion. For practical purposes, Scottsdale Well No. 76 was simulated as an extraction well in two pumping regimens and is located on the 5 µg/l TCE contour for initial modeling conditions. The model results predict that Well No. 76 could soon be affected with low concentrations of VOCs; and this has been verified by recent sampling, after which the well was removed from potable service. The model results do not indicate that there will be no further migration of the zone of contamination. The results do suggest that under the pumping regimens used for modeling operations, migration should not be substantial and the areal extent of affected ground water should be reduced. Pumping regimens used for modeling operations were based on the assumption that pumping patterns in the model area would remain unchanged. Attempting to predict future pumping patterns throughout the model area based on historic pumping data is at best an approximation, but a necessary one for this modeling application. In no way do the model's limitations indicate that the proposed partial remedy may not achieve the remadial action objectives stated in the OUFS.

SPECIFIC QUESTIONS AND COMMENTS

From EPA Region IX, Quality Assurance Management Section

1. The OUFS report mentions sampling programs and water quality in the Background and Site History Section, but the actual quality of the data is not mentioned. The author should discuss whether the quality of the data was determined, and whether the data quality was considered in developing potential remedial actions at the IBW site.

RESPONSE: The presentations of water quality data in the OUFS are brief summaries of extensive available data from monitor wells and affected City wells. These data were summarized in order to provide a manageable database from which

site. EPA will address the Upper Alluvial Unit further in the overall Feasibility Study.

2. Why was the 1×10^{-6} level used in establishing several "Other Criteria" and "Treatment Goals to Meet ARARs" rather than a 1×10^{-5} or 1×10^{-4} level? Why were the "Treatment Goals to Exceed ARARs" for some chemicals fixed at one-half the MCLs rather than at other levels closer to the MCLs?

RESPONSE: ARARs and Other Criteria were established for the OUFS in accordance with "EPA Interim Guidance on Compliance With Other Applicable or Relevant and Appropriate Requirements" (52 FR 32496 et seq) and in conference between the City of Scottsdale and EPA Region IX Toxics and Waste Management Division Officials. For chemicals that have not been assigned Safe Drinking Water Act Maximum Contaminant Levels MCLs), it is EPA's policy to set cleanup levels (for potable end use) such that the total additive excess lifetime cancer risk of all chemicals present in the treated water fall within the range of 10^{-4} to 10^{-7}. As a general matter, EPA recommends consideration of a risk level of 10^{-6}, since this level is effective in protecting human health and the environment and can be reasonably implemented.

The National Contingency Plan (NCP) requires the evaluation of alternative remedial actions that will achieve and exceed ARARs. EPA has not established guidelines for quantitatively determining cleanup levels that "exceed ARARs." However, the identified "Other Criteria" were chosen for carcinogens, and one-half of the MCLs were chosen for non-carcinogens as treated water levels which would illustrate the differences in cost-effectiveness for the treatment alternatives based on achieving a significantly higher public health risk reduction than would be achieved when "meeting ARARs." This is the intent of the dual-analyses provision of the NCP. It should be noted that analyses in Section 5 of the OUFS indicated that no practical differences in the design criteria, capital costs, and operating and maintenance costs occur between the two sets of treatment goals due to the nature of the treatment processes evaluated. Also, neither of the VOCs that had treatment goals set at one-half of the MCL were determined to be controlling constituents in the treatment analyses.

From Arizona Department of Environmental Quality

1. The 5 µg/l TCE contour surrounding the zone of ground water contamination is identified on Figure 6, Appendix A. Data defining the occurrence and concentrations of contaminants in some of the study area are incomplete

or lackin. What specific data in ese areas were used to establish the 5 µg/l boundaries?

RESPONSE: All available ground water chemistry data were used to construct water quality data matrices, and the concentrations of TCE were contoured as accurately as possible using these data. The zone of contamination was defined and the model was constructed using the best available data. Although the extent of contamination is not, and may never be, precisely defined, the effectiveness of pumping and treatment of contaminated ground water can be evaluated using available data. Future work may provide data that would more accurately delineate the zone of contamination; however, those data are not available at this time. It is premature to draw a final conclusion regarding the extent of contamination, but it is not premature to make qualitative conclusions about the effectiveness of pumping as a ground water control for the OUFS.

2. Ground water inflow via leakage from the Upper Alluvium Unit was not included in the model recharge because it is not believed to be substantial relative to other recharge sources. It should be noted that contaminant movement from the Upper to the Middle and Lower Alluvium Units is believed to be the primary mechanism for the occurrence of deeper contamination. What data, calculations, and assumptions were used to determine the recharge volume of the Upper Alluvium Unit? How do these calculated volumes specifically compare to the other recharge sources?

RESPONSE: Results of recently completed fluid-movement investigations in the Indian Bend Wash area production water wells indicate that water from the Upper Alluvium Unit migrates to the Middle Alluvium Unit and Lower Alluvium Unit via existing wells which serve as conduits for ground water transport. Water from the Upper Alluvium Unit moves down the well casing to the underlying aquifer units where water moves into the lower part of the Middle Alluvium Unit and into the Lower Alluvium Unit through perforations at that level. Ground water is also believed to migrate from the Upper Alluvium Unit to the underlying units via movement in the annular space between the casing and the borehole wall. Leakage from the Upper Alluvium Unit is believed to be substantially less than migration via these methods. The volume of water contributed to the Middle Alluvium Unit via leakage from the Upper Alluvium Unit is believed to be small relative to underflow, and leakage was not considered for this modeling investigation. ADWR has conducted a detailed study of the water budget for the IBW area and has calculated recharge to the Middle Alluvium Unit via leakage. Because ADWR leakage values were based on an unreliable flow net analysis, a low level of confidence was assigned to the

ADWR values for leakage, and leakage was not used for the model. (See response to ADWR Comment No. 20.)

3. The TCE is assumed to be in a dissolved phase and was modeled as a nonreactive tracer. Should TCE more accurately be modeled as a nonreactive tracer with the appropriate retardation coefficient?

RESPONSE: TCE tends to adsorb onto organic carbon, and the migration of TCE in contaminated water is thereby retarded. A retardation coefficient could be used in the solute transport model to simulate this adsorption. The results would indicate zones of contamination of smaller areal extent than results obtained by assuming no retardation. VOC-affected ground water migrates fastest in the coarse gravel zones in which there is less organic carbon and retardation would not be expected to be substantial.

From Arizona Department of Water Resources

1. Paragraph 4 on page ES-5 seems unclear. Are P.2, P.3, and P.4 no more effective than P.0, or P.1?

RESPONSE: There is an error in this paragraph. Page ES-5, paragraph 4, sentence 2 should read: "Modeling results indicated that all of these other alternatives were significantly more effective in managing the affected ground water zone than pumping Alternative P.0 (no-action)."

2. On Table 3-1, injection should be addressed because it appears to be a viable ground water control for this area.

RESPONSE: Injection is not addressed because it is not compatible with the fundamental remedial action objective of potable end use for the City of Scottsdale.

3. The effects of Upper Alluvium Unit contamination and its impacts on this OUFS should be more fully addressed.

RESPONSE: Based on the best available data, the potential impacts of the Upper Alluvium Unit on the remedial action alternatives are thoroughly discussed and evaluated in Sections 4 and 5 of the OUFS. As additional data become available, they will be examined with respect to potential impacts on the selected partial remedy during final design and will be addressed in the overall FS for the IBW site.

4. Do the proposed pumping alternatives exclude the Upper Alluvium Unit?

RESPONSE: None of the extraction wells for VOC-affected ground water in Pumping Regimens P.1 through P.4 will pump

primarily Upper Alluvium Unit water. However, short-circuiting is occurring in some of the wells, and Upper Alluvium Unit water which migrates down the well, whether inside or outside of the casing, will be pumped. As stated in Sections 4 and 5 of the OUFS report, the potential impacts of this water have been accommodated in treatment facility analyses. The Upper Alluvium Unit will be addressed further in the overall FS for the IBW site.

5. Was the City of Scottsdale's CAP allotment and conservation measures called for in the Second Management Plan taken into account in the modeling of the various pumping regimens?

RESPONSE: Pumping regimen analyses are compatible with the demand projections of the City of Scottsdale's Water Resources Management Plan, June 1987. As stated in the Institutional Analysis portion of Section 5, Scottsdale has service area rights to pump the ground water within the limitations of its Active Management Area targeted per capita usage goals for the entire service area.

6. Regarding the Ground Water Management Act of 1980, the applicability of the Act is that it requires remedial actions to be consistent with the Act and are subject to management goals established by the AMA in which remedial actions are located. All of the alternatives of the remedial action are affected as they are under the jurisdiction of and require the approval of the Department of Water Resources.

RESPONSE: The Arizona Department of Water Resources, as well as Environment Quality, will be asked to concur with EPA's Record of Decision.

7. DWR is concerned with the justification and effect of constant head cells at most of the ground water model's boundaries, the effect of not inputting recharge into the model, the effect of not utilizing the Upper Alluvium Unit as a source of contaminants, and the effect of not knowing the western edge of the zones of contamination in the Middle and Lower Alluvium Units.

RESPONSE: No-flow cells are used to represent Camelback Mountain and Mummy Mountain, where the geologic formations are believed to have very low permeability. The remaining boundary cells are designated as constant head cells to simulate ground water underflow into the model area. The effect of constant head boundary cells is that drawdown will not occur within these cells. Because these boundaries are substantial distances from pumping centers used in the modeling operations, this approximation does not have a substantial effect on migration of the zone of contamination.

Recharge into the combined Middle and Lower Alluvium Units aquifer in the model area is believed to be small in relation to underflow into the model area. Analysis of water level hydrographs for the Upper, Middle, and Lower Alluvium Units indicates that recharge into the Upper Alluvium Unit has little effect on the pattern of ground water flow in the lower units, and recharge was not considered in the two-dimensional model.

The effect of not considering the Upper Alluvium Unit as a source of contamination in the model is that the contamination problem could continue for a longer period of time than if it were considered. To disregard the Upper Alluvium Unit as a source of contamination does not affect the areal extent of contamination in the combined Middle and Lower Alluvium Unit, but it may result in an underestimation of the length of time that contaminated ground water will occur in the aquifer system.

The zone of contamination was estimated for the model using the best available data. The feasibility of pumping and treatment of ground water was evaluated based on available data. If additional water quality data become available for the western part of the study area, the zone of contamination could be delineated more precisely, and pumping regimens might be refined to more effectively remove contamination. At this time there are no monitor wells or production water wells in the western part of the study area; therefore, precise definition of the western boundary of the zone of contamination is problematic. However, available data are adequate to conclude that pumping and treatment is a viable remedial action, and the requirements for the OUFS are met.

8. The number and complexities of the proposed remedial actions are limited and should be expanded to explore ways of minimizing cleanup time and enhancing containment.

RESPONSE: There are a number of potential scenarios for remedial action. The alternatives in the OUFS covered a broad spectrum while trying to identify reasonable actions that could be easily implemented.

The following comments were directed to specific sections of Appendix A--Ground Water Modeling:

9. Page 3, paragraph 2: The saturated thickness of the Upper Alluvium Unit reaches a maximum of 60 feet or more in the southern part of the model area.

RESPONSE: Comment noted.

10. Page 4, paragraph 1: Ground water flow directions are quite different than north and northwest in the central and north parts of the model area, where localized cones of depression exert influence.

RESPONSE: Ground water flow directions discussed in Appendix A are general flow directions for ground water in the alluvium units. This particular paragraph indicated the direction of ground water movement in the Middle Alluvium Unit in areas where water level measurements in monitor wells have been made.

11. Page 4, paragraph 2: The thickness of the Lower Alluvium Unit in the IBW area is probably greater than "200 to 600 feet." According to Oppenheimer and Summer (1980), total thickness of sediments below the Middle Alluvium Unit is on the order of 4,000 feet in the northeast part of the model area. Much of this thickness is composed of the Red Unit, but the thickness of the Lower Unit is really unknown in most of the study area.

RESPONSE: Thickness for the Lower Alluvium Unit given in the report was derived from analysis of drillers logs on file with ADWR.

12. Page 5, paragraph 2: It should be stated that the Lower Alluvium Unit is probably a much more important aquifer than the Red Unit in the south part of the Paradise Valley basin.

RESPONSE: Comment noted.

13. Page 7, paragraph 2: Under "model input," more data are needed to adequately evaluate the model. Can you please provide ADWR with the data matrices input into the model? Also, we would like copies of MODFLOW and MOC model runs in order to review the models' assumptions and limitations in an effective manner. Additionally, the uncertainty associated with most assumptions should be stated, and a range of possible values discussed.

RESPONSE: Errol L. Montgomery & Associates, the developer of the model and author of Appendix A to the OUFS, will continue to be available to discuss the ground water model in detail with representatives from ADWR.

14. Page 8, paragraph 1: Along the north, south, and east boundaries, constant head nodes are employed. Comparison of 1982 with 1988 water level measurements from wells located within one-half mile of those boundaries shows that, in the last 6 years, water levels have risen from 23 to 161 feet in the north, and have dropped 49 feet in the east. This suggests that the north and

east bound ..es are not actually co ..ant head areas, as the model assumes. Input of var..ole head boundaries would greatly affect the model's results, and the effect of such variation in heads should be explored during the sensitivity analysis process to see if the proposed remedial actions are affected.

RESPONSE: If sufficient data were available to accurately calculate flux along the boundary, then a head dependent prescribed flux boundary condition would be more accurate than a constant head boundary condition. However, data are limited and an algorithm for head dependent flux would be very approximate. The model boundaries are located at substantial distances from the zone of contamination (the area of concern for the modeling investigation) and do not substantially affect water levels in that area. Because of the location of the area of concern and the limited data available, the constant head boundary cells are believed to adequately approximate the hydrologic conditions and are suitable to evaluate the proposed partial remedy.

15. Page 8, paragraph 1: The use of constant head nodes at the western model boundary appears to be unjustified, unless transmissivity values are so low as to effectively simulate no-flow cells. Constant head cells may provide considerable underflow into the model area, and this underflow may not be actually occurring between Papago Buttes and Camelback Mountain, where depth to bedrock is probably less than 100 feet, and on the east side of the Papago Buttes. How much inflow is simulated along the western boundary? The effect of inappropriately large inflow values from the west (and north) may be to disallow contaminant transport to the west (and north). Migration of the contaminant zone along its western and northern margin in all pumping scenarios is minimal, even in contaminated areas inside or adjacent to cones of depression of extraction wells. Historically the zone of contamination has most likely migrated a considerable distance to the west and north, a situation not simulated by model results. The lack of contaminant migration along the western margin of the zone of contamination may be an effect of assuming unrealistically high ground water inflow values from the western boundary.

RESPONSE: The hydraulic head west of Papago Buttes, Camelback, and Mummy Mountains is substantially higher than the hydraulic head in the Paradise Valley basin. The steep hydraulic gradient and the coarse-grained lithology of the sediments allow large amounts of ground water to enter the Paradise Valley basin as underflow, even though saturated thickness between Papago Buttes and Camelback Mountain and between Camelback Mountain and Mummy Mountain may be relatively small.

16. Page 8, paragraph 2: Uncertainties in the flow net analysis should be stated (for example, the lack of detailed water levels and gradients, unknown leakage from the Upper Alluvium Unit, and unknown recharge from land surface to the Middle Alluvium Unit where the Upper unit is not saturated).

RESPONSE: Comment noted.

17. Page 8, paragraph 3: Could you provide a reference for the reported values of storage coefficient?

RESPONSE: Several references are given at the end of Appendix A. In addition to references cited in the report, studies by the U.S. Geological Survey and Arizona Department of Water Resources, which include data for the Indian Bend Wash area, were used to provide estimates for storage coefficient.

18. Page 9, paragraph 9: How sensitive is the model to the assumption that the Lower Alluvium Unit maintains a constant thickness?

RESPONSE: Pumping is the most sensitive stress on the ground water system. In the Lower Alluvium Unit, the altitude of the bottom of the perforations is substantially higher than the base of the Lower Alluvium Unit. Therefore, the sensitivity of the model to the thickness of the Lower Alluvium Unit is small. In effect, to estimate the thickness of th Lower Alluvium Unit is to estimate the transmissivity, so the sensitivity of the thickness of the Lower Alluvium Unit is less than the sensitivity of transmissivity.

19. Page 9, paragraph 1: Ground water recharge is usually considered to be a separate component from ground water underflow. Ground water recharge is here defined as deep percolation from the land surface to the aquifer, which is a different form of inflow than ground water underflow. A separate section on ground water recharge (as here defined) should be included in the report for completeness.

RESPONSE: For purposes of the modeling investigation, which deals only with the Middle and Lower Alluvium Units, ground water recharge is considered to be negligible.

20. Page 10, paragraph 1: In the ADWR IBW water budget memo dated 9/9/87, ground water recharge via leakage from the Upper Alluvium Unit and via direct recharge into the Middle Alluvium Unit was estimated to be equal to about 150 percent of total pumpage and about 200 percent of ground water underflow. Not taking recharge into the Middle Alluvium Unit into account is a limiting assumption of the model and should be discussed more fully.

RESPONSE: Additional evaluation of the estimates of underflow and recharge in the ADWR water budget is required. The ADWR flownet shows converging streamlines which imply infinite transmissivity. The Operable Unit model assumes that recharge is small relative to underflow, and therefore, recharge is disregarded in the two-dimensional model, although additional discussions with ADWR concerning this analysis are warranted.

21. Page 11, paragraph 2: Better water level data now available indicate head differences between composite wells and Middle Alluvium Unit-only or Lower Alluvium Unit-only wells range from as low as 10 feet where little pumping occurs to as much as 70 feet in areas where heavy pumping occurs.

RESPONSE: Comment noted.

22. Page 12, paragraph 1: Effective porosity is reported to be 25 percent, but on page 8 the specific yield is reported to be 10 percent. Which value was used in the model? This is particularly important because the model is reported to be sensitive to variations in effective porosity (page 13).

RESPONSE: Effective porosity was used for MOC, and specific yield was used for MODFLOW.

23. Page 12, paragraph 2: Can you please provide a reference for the reported values of dispersivity?

RESPONSE: Appropriate references can be found in: Hargis & Montgomery, 1982. Digital Simulation of Contaminant Transport in the Regional Aquifer System, U.S. Air Force Plant No. 44, Tucson, Arizona; Interim Report, October 11, 1982.

24. Page 12, paragraph 3: How sensitive is the model to variations in initial TCE concentration, particularly along the western margin of the zone of contamination which is basically undefined? Given the lack of TCE data in the west, what would be the effect of a "worst-case" scenario of contaminated ground water extending to the western boundary?

RESPONSE: If contaminated ground water extended to the western boundary of the model area, projections for the areal extent of contamination for the different pumping regimens would be larger. If water quality data become available to document this hypothetical zone of contamination, a new pumping regimen could be investigated to more effectively remove the contaminated ground water from the west.

25. Page 12, paragraph 3: The MOC model does not allow for introduction of additional contaminants into the system. Vadose zones in the Middle Alluvium Unit may contain sufficient TCE to provide a new source area not taken into account by the model. Additional sources not taken into account by the model include leakage-contaminated water from the Upper Alluvium Unit through cascading wells, as well as areawide vertical leakage from the Upper Unit. The effects of this model limitation are important and should be stated and discussed.

RESPONSE: Comment noted. The potential impacts of the Upper Alluvium Unit on the remedial action alternatives are thoroughly discussed and evaluated in Sections 4 and 5 of the OUFS.

26. Page 13, paragraph 3: The sensitivity analysis would be much more useful if provided in greater detail. Why were sensitivity runs for the flow model stopped after 5 years, but were run for 25 years for the transport model? What ranges of values were explored?

RESPONSE: The ground water flow system in the model approaches steady-state conditions after about 5 years after pumping starts. Therefore, the sensitivity analysis conducted on MODFLOW stopped after 5 years. The contamination distribution does not reach steady state, and 25 years was chosen as sufficient time for sensitivity analysis using MOC. Transmissivity, coefficient of storage, and hydraulic conductivity were varied by +20 percent. Effective porosity was varied by ±60 percent, and longitudinal dispersivity was varied by +400 percent.

27. The pumping values assigned to the different scenarios need justification by comparing them with future use projections for this area from the City of Scottsdale, the Phoenix Active Management Area, Paradise Valley Water Company, and/or Arcadia Water Company.

RESPONSE: For the purposes of the two-dimensional model, pumping patterns for wells other than the extraction wells for VOC-affected water were assumed to remain unchanged from 1986 pumping rates. As pumping in the future is documented, the model can be appropriately updated. (Also see response to ADWR Comment No. 5.)

MARY OF PUBLIC COMMENT T
MAY 5, 1988 COMMUNITY MEE..G
ON INDIAN BEND WASH SUPERFUND SITE

From Pamela Swift, Toxic Waste Investigative Group

1. EPA should study health impacts of past exposure to contaminated drinking water.

RESPONSE: It is the responsibility of the Agency for Toxic Substance and Disease Registry (ATSDR) to conduct a health assessment at each Superfund site.

2. EPA should put more effort into cost recovery.

RESPONSE: EPA will pursue cost recovery actions at Superfund sites in an appropriate manner.

3. DEQ should set up air toxics standards before the air stripper is built.

RESPONSE: No EPA comment.

4. City of Scottsdale should become more involved in this process--Mayor Drinkwater should hold a meeting with citizens.

RESPONSE: No EPA comment.

5. City of Scottsdale should consider impacts on EPA's projects when planning and zoning large projects that will need large amounts of water.

RESPONSE: No EPA comment.

From Carolina Butler, Scottsdale Resident

1. EPA should look at cancer rates among 40- to 50-year-old women who lived in the Indian Bend Wash area. Government should focus more on health problems.

RESPONSE: See No. 1 from above.

APPENDIX E

APPENDIX E.
NIBW GROUNDWATER MONITORING SCHEDULE[b]

		JANUARY		APRIL		JULY		OCTOBER		
Wells	Unit	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Discontinued
Participating Companies' Monitoring Obligations as of the Effective Date of the Amended Consent Decree.										
B-J	UAU			X				X	X	
D-1UA	UAU			X				X	X	
E-3UA	UAU			X				X	X	
E-5UA	UAU			X				X	X	
E-7UA	UAU			X				X	X	
E-9UA	UAU			X				X	X	
E-12UA	UAU			X				X	X	
E-13UA	UAU			X				X	X	
M-2UA	UAU			X				X	X	
M-10UA	UAU			X				X	X	
M-13UA	UAU			X				X	X	
W-3UA	UAU			X				X	X	
PG-3UA	UAU			X				X	X	
PG-4UA	UAU			X				X	X	
PG-5UA	UAU			X				X	X	
PG-6UA	UAU			X				X	X	
PG-8UA	UAU			X				X	X	
PG-10UA	UAU			X				X	X	
PG-11UA	UAU			X				X	X	
PG-15UA	UAU			X				X	X	
PG-16UA	UAU			X				X	X	
PG-18UA	UAU			X				X	X	
PG-19UA	UAU			X				X	X	
PG-22UA	UAU			X				X	X	
PG-23UA	UAU			X				X	X	
PG-24UA	UAU			X				X	X	
PG-25UA	UAU			X				X	X	
PG-28UA	UAU			X				X	X	
PG-29UA	UAU			X				X	X	
PG-31UA	UAU			X				X	X	
PG-35UA	UAU			X				X	X	
PG-36UA	UAU			X				X	X	
PG-38UA	UAU			X				X	X	

[a] Water Quality means the analysis of NIBW Contaminants of Concern.

[b] Monitor wells that have five feet or less of water, before purging, will be considered dry and no samples will be collected.

APPENDIX E.
NIBW GROUNDWATER MONITORING SCHEDULE[b]

		JANUARY		APRIL		JULY		OCTOBER		
Wells	Unit	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Discontinued
B-1UA	UAU			X				X		
B-3UA	UAU			X				X		
E-1UA	UAU			X				X		
E-2UA	UAU			X				X		
E-4UA	UAU			X				X		
E-6UA	UAU			X				X		
M-3UA	UAU			X				X		
M-4UA	UAU			X				X		
M-5UA	UAU			X				X		
M-8UA	UAU			X				X		
M-9UA	UAU			X				X		
M-11UA	UAU			X				X		
M-12UA	UAU			X				X		
M-15UA	UAU			X				X		
M-16UA	UAU			X				X		
ST-1UA	UAU			X				X		
PG-7UA	UAU			X				X		
PG-9UA	UAU			X				X		
PG-12UA	UAU			X				X		
PG-13UA	UAU			X				X		
PG-14UA	UAU			X				X		
PG-17UA	UAU			X				X		
PG-20UA	UAU			X				X		
PG-21UA	UAU			X				X		
PG-26UA	UAU			X				X		
PG-27UA	UAU			X				X		
PG-30UA	UAU			X				X		
PG-32UA	UAU			X				X		
PG-33UA	UAU			X				X		
PG-34UA	UAU			X				X		
PG-37UA	UAU			X				X		
PG-39UA	UAU			X				X		
E-14LA	LAU			X				X		
PG-4MA	UMAU			X				X		
PG-5MA	UMAU			X				X		
PG-6MA	UMAU			X				X		
PG-7MA	UMAU			X				X		

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APPENDIX E.

NIBW GROUNDWATER MONITORING SCHEDULE[b]

		JANUARY		APRIL		JULY		OCTOBER		
Wells	Unit	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Discontinued
PG-23MA/LA	UMAU			X				X		
PG-38LA	LAU			X				X		
PG-39LA	LAU			X				X		
EXTRACTION WELLS										
COS-71	Monthly sampling for water quality									
COS-72	Monthly sampling for water quality									
COS-75A	Monthly sampling for water quality									
COS-31	Monthly sampling for water quality									
PCX-1	Monthly sampling for water quality									
AAWC-15	Monthly sampling for water quality									
AAWC-14	Monthly sampling for water quality									
MEX-1			X		X		X		X	
SRP 23.6E6N			X		X		X		X	
7EX-3MA			X		X		X		X	
7EX-4MA			X		X		X		X	
7EX-5MA			X		X		X		X	
SRP's Maximum Monitoring Obligations from the Effective Date of the Amended Consent Decree through March 2013.										
E-1MA	UMAU		X	X	X		X	X	X	
E-5MA	UMAU		X	X	X		X	X	X	
E-8MA	UMAU			X				X	X	
E-10MA	UMAU		X	X	X		X	X	X	
M-2MA	UMAU			X				X	X	
M-4MA	UMAU		X	X	X		X	X	X	
M-5MA	UMAU		X	X	X		X	X	X	
M-6MA	UMAU		X	X	X		X	X	X	
M-7MA	UMAU			X				X	X	
M-9MA	UMAU			X				X	X	
M-10MA	UMAU		X	X	X		X	X	X	
M-11MA	UMAU			X				X	X	
M-12MA	UMAU			X				X	X	
M-15MA	UMAU		X	X	X		X	X	X	
M-16MA	UMAU			X				X	X	

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APPENDIX E.
NIBW GROUNDWATER MONITORING SCHEDULE[b]

		JANUARY		APRIL		JULY		OCTOBER		
Wells	Unit	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Discontinued
PA-3MA	UMAU			X				X		
PA-7MA	UMAU			X				X		
PA-10MA	UMAU		X	X	X		X	X	X	
PA-12MA	UMAU		X	X	X		X	X	X	
PA-16MA	UMAU			X				X	X	
PA-20MA	UMAU			X				X	X	
PA-21MA	UMAU			X				X	X	
PA-23MA	UMAU			X				X		
S-1MA	UMAU			X				X	X	
S-2MA	UMAU			X				X	X	
W-1MA	UMAU		X	X	X		X	X	X	
W-2MA	UMAU		X	X	X		X	X	X	
PG-4MA	UMAU								X	
PG-5MA	UMAU								X	
PG-6MA	UMAU								X	
PG-7MA	UMAU								X	
PG-23MA/LA	UMAU								X	
D-2MA	UMAU		X	X	X		X	X	X	
M-17MA	UMAU		X	X	X		X	X	X	
B-1MA	UMAU			X				X		
M-1MA	UMAU			X				X		
M-3MA	UMAU			X				X		
M-14MA	UMAU			X				X		
PA-1MA	UMAU			X				X		
PA-4MA	UMAU			X				X		
PA-14MA	UMAU			X				X		
PA-17MA	UMAU			X				X		
PG-57MA	UMAU			X				X		
PG-51MA	LMAU			X				X		
PG-47MA	LMAU			X				X		
PG-50MA	LMAU			X				X	X	
PG-48MA	LMAU		X	X	X		X	X	X	
PG-49MA	LMAU								X	
PG-54MA	LMAU								X	
PG-55MA	LMAU								X	
PG-56MA	LMAU								X	
PG-46MA	LMAU									X

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APPENDIX E.
NIBW GROUNDWATER MONITORING SCHEDULE[b]

		JANUARY		APRIL		JULY		OCTOBER		
Wells	Unit	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Water Levels	Water Quality[a]	Discontinued
PG-45MA	LMAU									X
PG-52MA	LMAU									X
PG-53MA	LMAU									X
E-7LA	LAU			X				X	X	
M-5LA	LAU			X				X	X	
M-10LA	LAU			X				X	X	
M-14LA	LAU			X				X	X	
M-16LA	LAU			X				X	X	
PA-2LA	LAU			X				X	X	
PA-5LA	LAU			X				X	X	
PA-6LA	LAU			X	X			X	X	
PA-8LA	LAU			X				X	X	
PA-9LA	LAU			X				X	X	
PA-11LA	LAU			X				X	X	
PA-13LA	LAU			X	X			X	X	
PA-15LA	LAU			X				X	X	
PA-18LA	LAU			X				X	X	
PA-19LA	LAU			X				X	X	
PA-22LA	LAU			X				X		
S-1LA	LAU			X				X	X	
S-2LA	LAU			X	X			X	X	
PG-1LA	LAU		X	X	X		X	X	X	
PG-2LA	LAU			X	X			X	X	
PG-40LA	LAU		X	X	X		X	X	X	
PG-38LA	LAU								X	
PG-39LA	LAU								X	
PG-42LA	LAU		X	X	X		X	X	X	
PG-43LA	LAU		X	X	X		X	X	X	
PG-44LA	LAU		X	X	X		X	X	X	
E-1LA	LAU			X				X		
M-2LA	LAU			X				X		
M-9LA	LAU			X				X		
PG-41MA/LA	LAU									X

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APPENDIX F

Appendix F
Reports and Plans Identified in Section X.B.1.

Groundwater Monitoring and Evaluation Plan
Sitewide Operation and Maintenance Plan
Remedial Design/Remedial Action Plan
Communication Plan
Contingency and Emergency Response Plans
Sampling and Analysis Plan
Health and Safety Plan
Health and Safety Training Plan
Laboratory Quality Assurance Plan
Any future plans requiring EPA approval called out by the Statement of Work or required in any plans listed above

APPENDIX G

APPENDIX G

68-W-98-225

MONTHLY STATUS REPORT

NIBW - RD/RA Oversight

Period: 10/28/00 through 11/24/00

Work Assignment No.: 036-RXBF-0920
CH2M HILL Project No.: 152501
Team Sub Project No.:

Project Officer: Katherine Meltzer
Work Assignment Mgr.: Melissa Pennington
Site Manager/Firm: Phillip Whitmore/CH2M HILL

A. Expenditure Limit

4,112 (74.76%) of the LOE Expenditure Limit (5,500) and $429,364.76 (78.07%) of the Dollar Expenditure Limit ($550,000.00) has been expended.

B. Focus Items / Work Assignment Scope

Provide project planning, management, and coordination. Provide technical meeting support and document review at the direction of EPA's WAM.

C. Activities Performed During Reporting Period

This section presents a description of activities performed on each task. *Note: Report 1 contains by task, names of staff, "P" levels, and number of hours worked for each individual.*

Task 1 - Project Planning and Support (PP)

- SM performed routine project management activities (budget tracking, document control, filing, project staffing, and preparation/submittal of the monthly report and invoice).

Task 2 - Community Relations (CR)

- SM coordinated and reviewed periodic status of document repositories, and prepared and submitted status report to RPM.

Task 3 - Data Acquisition (DA)

- SM coordinated and reviewed CGTF split sampling activities.
- Staff Scientist collected split samples at CGTF.

Task 4 - Sample Analysis (SN)

No Activity

Task 5 - Analytical Support/Data Validation (AN)

No Activity

Task 6 - Data Evaluation (DE)

- SM finalized COS 25 End Use analysis and submitted memo.
- Staff Hydrogeologist prepared tables for revisions on COS 25 memo.

Task 7 - Review of PRP RD/RA Submittals (RP)

- SM reviewed FSA.
- SM reviewed semiannual groundwater production report.
- SM reviewed monthly water level reports.

Task 8 - Remedial Action Oversight (RO)

No Activity

Task 9 - Technical Meeting Support (TM)

- SM prepared for and participated in 11/15/00 FSA technical meeting.
- SM participated in teleconferences regarding project status and schedule.

D. Activities Planned During Next Reporting Period

This section includes a description of activities planned on each task during the next reporting period.

Task 1 - Project Planning and Support (PP)

- Perform project planning and coordination with EPA in teleconferences and planning meetings.
- Perform routine administrative activities including budget tracking, document tracking, filing, project staffing, and preparation/submittal of Monthly Status Reports and invoices.

Task 2 - Community Relations (CR)
- Conduct community relations support at the direction of EPA.

Task 3 - Data Acquisition (DA)
- Conduct data acquisition tasks at the direction of EPA.

Task 4 - Sample Analysis (SN)
- Provide sample analyses at the direction of EPA.

Task 5 - Analytical Support/Data Validation (AN)
- Provide analytical support and data validation at the direction of EPA.

Task 6 - Data Evaluation (DE)
- Evaluate data at the direction of EPA.

Task 7 - Review of PRP RD/RA Submittals (RP)
- Review PRP submittals at the direction of EPA.

Task 8 - Remedial Action Oversight (RO)
- Conduct oversight at the direction of EPA.

Task 9 - Technical Meeting Support (TM)
- Prepare for and attend technical meetings at the direction of EPA.

E. Anticipated Changes
None

F. Variances - Contract Cost Adjustments
None

G. Problems and Recommended Solutions
LOE and Dollar ELs have reached 75% spent. No immediate action is necessary.